284343

May 28, 2004

Docket Management System
Docket No. FAA-2004-17460 – 15
U.S. Department of Transportation
Room Plaza 401, 400 Seventh St., NW
Washington, DC 20590-0001

RE: **Comments for the Scoping Process for Lake Mead National Recreation Area (NMNRA) Air Tour Management Plan (ATMP)**

To Whom It May Concern:

These comments are submitted on behalf of the Grand Canyon Trust, The Wilderness Society, and the Sierra Club. Our combined memberships total over 1,000,000 persons spread throughout the United States.

The *Grand Canyon Trust* is a regional conservation group dedicated to protecting the canyon country of the Colorado Plateau. A longstanding goal of the *Grand Canyon Trust* is to restore natural quiet to the Grand Canyon, Zion, and Bryce Canyon, and to preserve natural quiet at Canyonlands, Arches, and other units of the National Park System in Arizona and Utah. *The Wilderness Society* works to protect America's wilderness and to develop a nationwide network of wildlands through public education, scientific analysis, and advocacy. The *Sierra Club* purpose is to "explore, enjoy, and protect the wild places of the earth; to practice and promote responsible use of the earth's ecosystem and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment, and to use all lawful means to carry out these objectives."

Our members visit public lands to experience nature, scenic wonders, and natural soundscapes, including times of deepest quiet and stillness, as well as to enjoy the many historic and cultural features – all of which our nation has chosen to preserve for posterity.

The management of commercial air tours and other aviation over national parks and wilderness is of great concern. Parks such as Lake Mead National Recreation Area are subject to overflights by many tens of thousands of commercial air tours every year. Commercial air tours in such volume can *fragment and disrupt* the Park experience for visitors. The auditory and visual intrusion can rob the visitor experience of those visiting the Park with the goal of seeking peace and a sense of remoteness, solitude, and contemplative recreation.

Our expectation is that the Federal Aviation Administration will work closely with the National Park Service (NPS) to regulate commercial air tours over the Lake Mead

National Recreation Area in a way that guarantees the visitors – particularly those in designated noise-sensitive zones – will be able to dependably experience natural quiet without air tour fragmentation and obliteration.

Grand Canyon-Parashant National Monument

> *"Full of natural splendor and a sense of solitude, this area remains remote and unspoiled, qualities that are essential to the protection of the scientific and historic resources it contains."*
>
> President William Jefferson Clinton
> January 11, 2000

With these words, the presidential proclamation established a vision and mandate whereby the Grand Canyon-Parashant National Monument (GCPNM) came into being. This Proclamation is the Department of the Interior's mandate for managing these BLM and NPS lands. The Proclamations identifies the specific resources that are so significant as to merit National Monument status under the Antiquities Act of 1906. These cited resources are known as "objects of historic and scientific interest," and the Department of the Interior is required to protect them. For the Arizona Strip, these "objects of interest" include wildlife, archeological, geological, and scenic resources in the Monuments.

The Proclamation further stressed that this undeveloped remote area was located "on the edge of one of the most beautiful places on earth, the Grand Canyon." It is, as President Clinton further proclaimed, a "geologic treasure," whose striking sedimentary rock layers afford a great deep-time journey into "understanding the geologic history of the Colorado Plateau," a history "spanning almost 2 billion years." We request that the FAA consider that the Monument's proclamation clearly identifies solitude and the area's remote and unspoiled qualities as essential to the protection of the scientific and historic resources it contains.

The GCPNM is jointly managed by the National Park Service (NPS) and the Bureau of Land Management (BLM), with the NPS having primary management authority over the southern portion. These agencies are currently working on a Resource Management Plan (RMP) for this Monument and the rest of the Arizona Strip. This RMP will determine recreation, motorized and non-motorized travel, wildlife, and other critical management decisions for the next ten to fifteen years. The draft RMP and Environmental Impact Statement (EIS) for this area are due to be released in approximately September 2004. We request that the FAA consult with the Monument planning staff to ensure the LMNRA Air Tour Management Plan is consistent with the desired future conditions that the RMP determines for this area.

Air Tour Operations within Grand Canyon-Parashant National Monument

Any portion of the Grand Canyon Parashant National Monument that comes under purview of this Air Tour Management Plan (ATMP) scoping is of critical concern environmentally.

However, the actually applicable GCPNM acreage for this particular ATMP planning effort appears constrained by two factors:

1. A Special FAA Flight Rules Area (SFAR 50-2) has preemptory aviation control in much of the LMNRA portion of the GCPNM. This restricted zone was established long ago, to advance requirements of the National Parks Overflights Act, pertaining to the substantial restoration of the natural quiet of Grand Canyon National Park.

2. The great bulk – though not all – of the GCPNM to the north of SFAR 50-2, is administered by the Bureau of Land Management (BLM). The BLM portion does not fall under purview of the National Parks Air Tour Management Act, excepting only that one-half mile wide BLM strip abutting the LMNRA northern boundary.

This leaves the southern NPS-administered portion of the Monument to address in terms of an ATMP. Of these, the major portion –185,000 acres – has been designated by the Park Service as "Lands Meeting Suitable Wilderness Act Criteria"[1], or else as "Primitive" or "Semi-Primitive" as per the Lake Management Plan. In addition, the Arizona Wilderness Coalition has conducted extensive, on-the-ground inventories that identified 185,533 acres of wilderness-quality lands within the NPS-administered portion of GCPNM.

Another key consideration – aside from these co-administered lands' noise-sensitive status – has to do with the Grand Canyon National Park just to the south. Any tour aircraft operating over these *particular* GCPNM lands would also be on routes within two to ten nautical miles of the Grand Canyon National Park Boundary. Since aircraft noise easily travels two miles and sometimes ten miles, any such aircraft would be emitting noise which would often be audible within the national park itself.

Admission of additional tour aircraft or routes, via an ATMP, and which utilize the LMNRA areas of the GCPNM, would undermine or destroy the wilderness character of such lands. It would further be counter to the challenging goal of substantially restoring natural quiet of the Grand Canyon National Park to the south (which by presidential directive must be reached by 2008).

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[1] See Map (Figure 7), "Proposed and Potential Wilderness, LMNRA Portion of GCPNM", page 41, the Aerial Operations within Lake Mean National Recreation Area – Environmental Assessment. February, 2004. Department of the Interior, National Park Service. Available online at http://www.nps.gov/lame/airopsea.pdf.

KEY POINT: Therefore, the only appropriate course of action is for the FAA to wholly prohibit any air tour overflight within the NPS-administered portions of the GCPNM/LMNRA, and within any other portion of the GCPNM within ten nautical miles of the Grand Canyon National Park boundary.

Wilderness, and "Wilderness Character"

"The Power of Imagination Makes Us Infinite."
■ John Muir

"Imagination is more important than Knowledge;
Knowledge is limited; Imagination embraces the entire world."
■ Albert Einstein

Wilderness, and equally important "Wilderness Character" of proposed or designated wilderness, is a most critical dimension of the Lake Mead National Recreation Area and of the Grand Canyon-Parashant National Monument. The NPS maps distributed at the scoping hearings on April 27 reveal the large extent (677,000 acres) of designated or proposed wilderness within LMNRA. (Also identified are "primitive" and "semi-primitive" lake management zones, which are correspondingly noise-sensitive.[2])

There are several new Y2002-designated wilderness units in the Nevada/Arizona portion of LMNRA. Within the GCPNM a still more "ultimate" wilderness (owing to particular remoteness, extreme solitude opportunity, and "deep time" connection) has been proposed by the Arizona Wilderness Coalition for 185,522 acres along the north rim of the Grand Canyon. We ask that the draft ATMP environmental assessment (EA) discuss these units individually, and in the detail they deserve, relative to the detailed complexity of air tour management.

Philosophically, we offer this foundation. That wilderness depends as much on attainable "states of mind" as well as "condition of the land" has long been understood. (See quotes from John Muir and Albert Einstein, above). An important goal of the backpacker or wilderness hiker/camper is often for personal "emptying out" and for regeneration. Consequently, his/her extended opportunity for *immersion* in wilderness – thereby expanding the *imagination* (without constraint, fragmentation, or disruption) – becomes paramount.

In turn, this means freeing ourselves from reminders of industrial civilization, that we might "know ourselves" and our cosmos differently.

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[2] These lake areas likely will need to be re-configured in the NPS' pending Low Water Management Plan, (in preparation) owing to the plummeting levels of Lake Mead as long-term drought continues. Re-configuration will be necessary in order to maintain the original five (5) percent" quiet" proportion specified in the Lake Management Plan for LMNRA.)

The following references (enclosed), are thus helpful in a foundational sense in this regard. We ask that they be reviewed by both agencies in their entirety, as a part of scoping.

1. "The Eloquent Sounds of Silence," by Pico Iyer
   This was originally a Time Magazine Essay (1993), and served as the Preface to the National Park Service's 1995 Report to Congress on "*Effects of Aircraft Overflights on Units of the National Park System.*"

2. "The Spiritual Dimension of Wilderness: A Secular Approach for Resource Agencies," by Roger Kaye, (September 2002)
   This is a deeply researched, thought out "white paper", prepared by a U.S. Fish and Wildlife Service professional , based in Fairbanks, AK, (at 907-451-5707), developed in support of the *"Wilderness Character"* section of the draft USFWS "Wilderness Stewardship Policy," which received very favorable public comment after its publication in the *Federal Register* on January 16, 2001, USFWS Notice: at Federal Register 66 (10) Exhibit 3, at p. 3729. (Enclosed in entirety.)

3. "Why Wilderness?", by Roderick Frazier Nash
   In *Plateau Journal*, pp. 55-61. See also Nash's seminal book, *Wilderness and the American Mind*, (third revised edition, 1982).

4. "Aesthetic, Affective, and Cognitive Effects of Noise on Natural Landscape Assessment," by Britton L. Mace, Paul A. Bell, and Ross J. Loomis
   Society and Natural Resources 12: 225-242, (1999) (Title page, with abstract, enclosed.)

5. "Source Attribution of Helicopter Noise in Pristine National Park Landscapes," by Britton L. Mace, Paul A. Bell, Ross J. Loomis, and Glenn Haas, *Park and Recreation Management* 21(3), 97-119 (2003)

6. "Visibility and Natural Quiet in National Parks and Wilderness Areas: Psychological Considerations," by Britton L. Mace, Paul A. Bell, Ross J. Loomis, *Environment and Behavior* 36 (1), 5-31 (2004)

Once these writings (and many others they reference) have been carefully reviewed and contemplated, it will be apparent why the protection of wilderness values from the threat of rampant, uncontrolled motorization is an *ultimate concern,* i.e., that which is perceived as of greatest and most enduring importance.

We ask the FAA to consider maintaining natural quiet over all wilderness quality lands, including designated wilderness, NPS-proposed and proposed potential wilderness, and citizen-proposed wilderness in LMNRA, including the portion within Grand Canyon-Parashant National Monument.

Environmental Assessment with National Park Service Involvement

We expect a fully cooperative effort between the FAA and the NPS to develop this EA. We also expect that the FAA will prepare the EA in accordance with newly released FAA Order 1050.1E. (This almost simultaneously is superceding FAA Order 1050.1D, "Policies and Procedures for Considering Environmental Impacts," thereby permitting more sensitive and appropriate assessments for national park units.)

The FAA should defer to the expertise of the NPS staff when determining noise and other air tour impacts on national parks visitors, resources, and values. The NPS mission is protecting parks and helping visitors enjoy those parks, including in the deeper contemplative sense, and it has nearly a century or experience protecting national parks.

The *NPS Organic Act of 1916* states: "The National Park Service shall promote and regulate the use of the Federal areas known as national parks by such means and measures as conform to the fundamental purpose of the said parks... which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means (emphases added) as will leave them unimpaired for the enjoyment of future generations." [16 USC 1].

In addition, the Department of the Interior has a mandate to protect the remote and unspoiled nature of the GCPNM, as defined by the Presidential proclamation creating the monument:

> "The Grand Canyon-Parashant National Monument is a vast, biologically diverse, impressive landscape encompassing an array of scientific and historic objects... Full of natural splendor and a sense of solitude, this area remains remote and unspoiled, qualities that are essential to the protection of the scientific and historic resources it contains."
>
> "...NOW, THEREFORE, I, WILLIAM J. CLINTON, President of the United States of America, by the authority vested in me by section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), do proclaim that there are hereby set apart and reserved as the Grand Canyon-Parashant National Monument, for the purpose of protecting the objects identified above..."
>
> "The Secretary of the Interior shall manage the monument through the Bureau of Land Management and the National Park Service, pursuant to applicable legal authorities, to implement the purposes of this proclamation. The National Park Service and the Bureau of Land Management shall manage the monument cooperatively and shall prepare an agreement to share, consistent with applicable laws, whatever resources are necessary to properly manage the monument; however, the National Park Service shall continue to have primary management authority over

the portion of the monument within the Lake Mead National Recreation Area..." [emphasis added]

Subsequent legislation – and the National Park Service *2001 Management Policies* – has reinforced NPS' mandate to conserve park resources and values in the National Park System, providing for public enjoyment of the National Park System, but only in ways that prevent the impairment of those resources, and specifically including the natural soundscape. This reference was made far more detailed and explicit with the Y2000 issuance of *NPS Director's Order 47*, re Soundscape and Noise Management.

In this regard, *Public Law 106-181, Sec. 802*, signed into law on April 5, 2000, contains Congress' determination that the Federal Aviation Administration has the authority to "preserve, protect, and enhance the environment by minimizing, mitigating, or preventing the adverse effects of aircraft overflights on public lands." The same law, *Sec. 804(e)*, also reaffirms Congress' determination to FAA that the substantial restoration of natural quiet in the great Park unit immediately abutting the LMNRA/GCPNM – the Grand Canyon National Park – proceed "forthwith" in accordance with the 1987 Overflights Act, in the face of continuing large numbers of air tours there (many of which use the LMNRA/GCPNM for access.)

Additionally, the FAA's Draft *Noise Abatement Policy 2000* – issued July 14, 2000 – included an updated policy with respect to the national parks, specifically with respect to environmental assessment and mitigation. We ask the FAA to describe the draft policy's status, particularly regarding pre-existing policy section(s) and other representations concerning intended treatment of federally managed, noise-sensitive areas.

Verification of Commercial Air Tour Flight Numbers

We have learned that in some cases, FAA's application instructions to commercial air tour operators may have been unclear, inconsistent, misunderstood, incomplete, or highly subject to manipulation in response.

Therefore, FAA should not proceed with the ATMP process for Lake Mead NRA until the interim operating authorities (IOA's) already granted have been subjected to a rigorous verification process. Furthermore, we ask that the FAA expeditiously release to the public the business names for each "IOA" granted, the number of annual flights granted for the IOA, and the parks over which those air tour operators are authorized to fly, including and in addition to the Lake Mead NRA. (Logically, any associated Grand Canyon National Park allocations and routes therein flown by the 17 LMNRA operators, should also be disclosed, in this instance.) The law also requires a public comment opportunity in response to said Notice – itself far overdue – so that these IOA's can be improved in consultation with the National Park Service and FAA.

Ambient Baseline for Analysis of Noise

There are many wilderness areas, and other noise-sensitive regions (e.g., "primitive" and "semi-primitive" designated in watercraft regulation/zoning), within the LMNRA. Particularly within these zones, the FAA and the NPS should expeditiously establish the baseline natural ambient noise level, using the NPS' "L90" threshold, thus enabling determination of what level of noise is detectable by the human ear. From this it will be possible to assess noise impacts and to set quantitative thresholds and standards, such as can be approved and supported by the NPS personnel with expertise in soundscape and park resource protection.

Cumulative Impacts

Cumulative effects are the direct and indirect effect of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action (40 CFR Part 1508.7). This includes potential actions within and outside the recreation area boundary.

Cumulative impacts, especially of noise, need to be adequately, rigorously, and quantifiably determined, for each square mile of the LMNRA. An EA that does not quantify noise impacts, much less aggregate and quantify *cumulative* impacts, of noise in the unit as a result of various human-made sources, risks being legally insufficient. Site-specific noise maps, tables, and single-event analyses, will be prerequisite.

Therefore, we request that the FAA develop a proper cumulative impacts analysis. This analysis should include other human-generated noise (motorized vessels on Lakes Mead and Mojave, other aircraft, vehicle noise, and NPS operational noise). The analysis should also include indirect and cumulative impacts on adjacent lands, such as the BLM-managed portion of GCPNM. We ask the FAA to supply maps of typical flight tracks and densities (by hour, by day, by season, etc.), particularly for wilderness and primitive zones. These should be drawn up according to the types and moving three-dimensional patterns of aircraft, and noise levels modeled/computed.

[Examples of such depictions – for high level aircraft, but needed also for those at lower levels – to support the *overall* cumulative impact analysis and public understanding would be:

1. Figure IV.9, "IFR Flight Paths for Cal Black Memorial Airport," Cal Black Memorial Airport, Halls Crossing, Utah, Draft Supplemental Environmental Impact Statement, January 2001, at Page 4-24. (FAA) (See black and white copy attached).

2. Figure titled "Transportation Noise and Natural Soundscape Value – Aircraft Routes – 3 p.m. Takeoffs") from a 2004 Symposium paper by Nick Miller of HMMH (found at Page 23, from his larger report posted on the web at http://www.techtransfer.berkeley.edu/events/air/2004/Miller.pdf (HMMH) (See black and white copy attached.)

3. Figure 3: "Average Daily Frequency of Commercial Airplanes over the U.S." found within "Pathfinder Contrail Studies" at Sec.3.2, "Air Traffic Density" at http://www-pm.larc.nasa.gov/sass.html (NASA)] (See black and white copy attached.)

4. Scope of Work for the Draft EIS currently being prepared by Landrum and Brown for the *St. George, Utah* Replacement Airport (FAA). The project's Scope of Work stipulates the preparation of graphics and detailed analysis re flight patterns and associated cumulative noise impacts on nearby Zion National Park. (DEIS is pursuant to remand to FAA, ordered by the U.S. Court of Appeals, D.C. Circuit, in *Grand Canyon Trust* vs. *FAA,* decided May 24, 2002.) The Scope of Work is available on the St. George City Airport's website.]

We ask the FAA to include this proposed *St. George, Utah* replacement airport on the NPS Scoping Chart, "Regional Airports/Airstrips: Existing and Proposed." In addition, the FAA should add the rapidly growing nearby general aviation airports at nearby *Hurricane, Utah*, and at *Colorado City, Arizona.*

Noise Model Validation

We also request that noise model applications be subjected to validation. It is important to know the validity of the outcome of the specific application of the computer noise model(s) of choice, given the particular terrain circumstances of Lake Mead NRA, including the GCPNM portion being assessed. There are standard statistical tests for determining this, and it is these tests of the validity of said application that should be a routine part of noise modeling.

An example of such Noise Model Validation is the National Park Service Report on "Aircraft Noise Model Validation Study" (HMMH Report No. 29586029 – January, 2003; see also Federal Register, Nov. 7, 2003, NPS Notice re the same.) This completes a study to determine which of four computer models best calculate tour aircraft audibility in the Grand Canyon. The study is at http://www.nps.gov/grca/overflights (It is understood that this summer an updated version of FAA's "INM" model will be validated against the "preferred" model identified in that study.)

"Forecasting" in Grand Canyon region; and the National Parks Overflights Act (P.L. 100-91)

One readily and *reasonably foreseeable* action for cumulative impacts analysis, therefore, is that between 2004 and 2008, the noise from air tours over the Grand Canyon National Park will need to be significantly reduced from currently authorized levels, in order to timely satisfy the requirements of the 1987 Overflights Act, the presidential directive of 1996, and the Congress's subsequent direction that this be "forthwith."

Logically, one would expect commensurate, coordinated account taken in any independent FAA forecasts in the areas with which we are here focused. Consequent reduction in the number of "in transit" air tours overflying Lake Mead NRA en route to the Grand Canyon should be forecasted in the near-term (2005-2010) – for each alternative -- within this EA, with the consequent increment of noise reduction.

Therefore, in developing each alternative for this draft Environmental Assessment, the FAA and the NPS should also take into account the entire range of options (and likely timeline) for the air tours over the Grand Canyon itself, as independently phased or

otherwise controlled by the Overflights Act. A similar timeline and set of options will also ensue from the enforcement of the Final FAA Rule on National Air Tour Safety Standards (pending).

The total number of annual air tours listed in this LMNRA Scoping Document for ATMP should not, therefore, be considered as the acceptable or expected number of commercial air tours over the LMNRA in perpetuity. Other options that should be publicly assessed for managing these tours are as listed in the Air Tour Management Act (P.L. 106-181), and in the scoping documents.

Supplemental Metrics

1. **"Median Quiet Interval" (MQI)**
   We request the FAA utilize a supplemental, audibility-based metric, the "Median Quiet Interval" (MQI) for a variety of sites within the wilderness areas and for other noise-sensitive designated quiet zones. The MQI is defined as the median time interval where there is no motorized noise-intrusion audible. This would provide a key, "user-friendly" and quantitative impact assessment indicator. The FAA and the NPS would thus assess the time intervals between passage of aircraft and the resultant disturbance of natural quiet, at a variety of back-country sites within LMNRA.

2. **"Time Above" (TA)**
   For noise-sensitive areas, we request – consistent with Park Service established policy and expertise – that the FAA employ for aircraft noise another audibility based metric, specifically, "Time Above 'L90'". (In practical terms, this would approximate "Time Above 20 dBA" for most backcountry sites within the LMNRA. This Time Above metric (TA20) for the backcountry-zoned portions of the LMNRA would hopefully approach zero in many or most of them, if a good ATMP is prepared.)

3. **"Number of Events" (N-Level)**
   This is the number of times that noise events' Lmax exceed any given decibel level, during a specified period of time.

4. **"Equivalent Sound Level" (Leq)**
   This is the average noise level over a specified time period, such as "curfew hours" or "air tour hours."

Clearly, we are pioneering a whole new area of environmental/noise understanding. The use of supplemental metrics is essential to public understanding and non-confusing assessment.

References: *Supplemental Metrics*

The FAA and the NPS should carefully review the February, 2002 Recommendation and Finding of the FICAN, re DNL vs. Supplemental Metrics, based on its February 2001 "Symposium on the Value of Supplemental Noise Metrics in Aircraft Noise Analysis," along with all symposium papers (available on the web at http://www.fican.org/Pages/Sympos03.html) (Cover page attached.)

See also: William Albee, "Why We Must Supplement DNL Noise Analysis", under the "White Papers" link at http://www.wyleacoustics.com. (entire copy attached.)

Conclusion

We appreciate the opportunity to have presented these comments, and request that we receive all future notices and information regarding these important issues. As we are embarking on a significant, new pioneering venture in terms of American airspace and national park history, we hope this material will facilitate deeper understanding, and elicit solutions which benefit future generations, and other Park units as well.

Sincerely yours,

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Source Attribution of Helicopter Noise in Pristine National Park Landscapes

Britton L. Mace
Paul A. Bell
Ross J. Loomis
Glenn E. Haas

ABSTRACT: Aircraft overflight noise from helicopter tours is frequently encountered in such national parks as Grand Canyon, Hawaii Volcanoes, Haleakala, and Bryce Canyon. Noise is an environmental stressor and is associated with a variety of physiological and psychological effects, some of which are long-lasting. Psychologically, attributing a stressor to a nonhostile origin (e.g., a helicopter rescue mission) could mitigate stress effects. In this study, 200 undergraduates rated National Park scenes while exposed to either natural sounds (birds, brooks, wind), helicopter noise attributed to tourist overflights, helicopter noise attributed to backcountry maintenance operations, or helicopter noise attributed to the rescue of a back country hiker. Regardless of the source, 60 decibel (dB(A)) helicopter noise resulted in lower ratings of scenic beauty, solitude, tranquility, freedom, naturalness, and preference, and higher ratings of annoyance. These effects occurred across all types of scenery. Results suggest that park management-related overflight noise is just as disturbing as tourist aircraft noise, and that the impact of this noise is substantial across demographic variables and across types of vistas.

KEYWORDS: Helicopter Noise, Sound Management, Aircraft Overflights, National Parks

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As of 2002, the National Park Service (NPS) is responsible for managing 384 unique areas of land spanning some 83 million acres in 49 states. In 1916, Congress passed the National Park Service Organic Act that established the first National Parks. The purpose of the National Parks, according to this legislation is "... to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Because of the wording of this act, controversies have periodically arisen. Some of these conflicts revolve around what constitutes "impairment," whether it be natural, cultural, atmospheric or auditory resources at issue. Over the past

ENVIRONMENT AND BEHAVIOR 36(1) 5-31
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VISIBILITY AND NATURAL QUIET IN NATIONAL PARKS AND WILDERNESS AREAS
Psychological Considerations

BRITTON L. MACE *is an assistant professor of psychology at Southern Utah University. His research interests include ambient stressors and their effects on the natural environment and the visitor experience, the valuation of public goods, environmental education, and social power and influence.*

PAUL A. BELL *is a professor of psychology and Director of the Center on Aging at Colorado State University. His research focuses on valuation of public goods, environmental stressors, environments for managing behavior associated with dementia, and conflict resolution.*

ROSS J. LOOMIS *is a professor of psychology at Colorado State University. His research interests include museum visitor behavior and visitor perceptions of environmental quality in national parks and other Class I lands.*

ABSTRACT: For over a century, authorities have recognized cultural and psychological benefits of preserving national parks and wilderness areas. Yet, with increases in visitation and mechanized travel, air and noise pollution are intruding more and more into preserved natural areas. Psychological research shows that humans can detect very low levels of these pollutants in natural and laboratory settings, that air and noise pollution detract from the enjoyment of the visitor experience, and that people place a high value on naturally quiet, pollution-free settings. This article discusses how psychological research is essential for a more complete understanding of the value and the influence of both visibility and quiet surroundings with a focus on

AUTHORS' NOTE: The authors thank Wayne Viney and two anonymous reviewers for their helpful comments and suggestions. Address correspondence to Britton L. Mace, Department of Psychology, Southern Utah University, Cedar City, UT 84720; e-mail: mace@suu.edu.

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by Roger Kaye
Sept. 18, 2002

Wilderness and the Human Spirit:
A Secular Approach for Resource Agencies

Introduction

> *All of us have the task of making a living; but we long for something more, something that has a mental, a spiritual impact on us. . . . if we are going to amount to anything as a great country we must give serious attention to our mental and spiritual needs – hard to define but of greatest importance*[1]

These words by the preeminent field biologist and wilderness proponent Olaus Murie reflect a theme that resonates through American wilderness writing: Beyond utilitarian and commodity needs, our natural landscapes serve needs that lie at the core of the human psyche – in the elusive realm of human experience described as the spiritual dimension. This was the recurring message of the earliest proponents of wilderness, most notably Henry David Thoreau and John Muir. It was espoused by scientists Aldo Leopold, Robert Marshall, and Sigurd Olson, who, with Murie, were instrumental in launching the wilderness movement. Howard Zahniser, chief author and lobbyist for the Wilderness Act described it as "the characteristic effect of an area we most deeply need to provide for in our [wilderness] preservation program."[2]

The power of spiritual values to capture the public imagination has not been missed by political leaders and public land managers at the highest levels. Consider the words of former Vice President Al Gore, in his book, *Earth in Balance: Ecology and the Human Spirit*:

> The twentieth century has not been kind to the constant human striving for a sense of purpose in life. . . .We retreat into the seductive tools and technologies of industrial civilization, but that only creates new problems as we become increasingly isolated from one another and disconnected from our roots . . . more people than ever before are asking, "Who are we? What is our purpose?"[3]

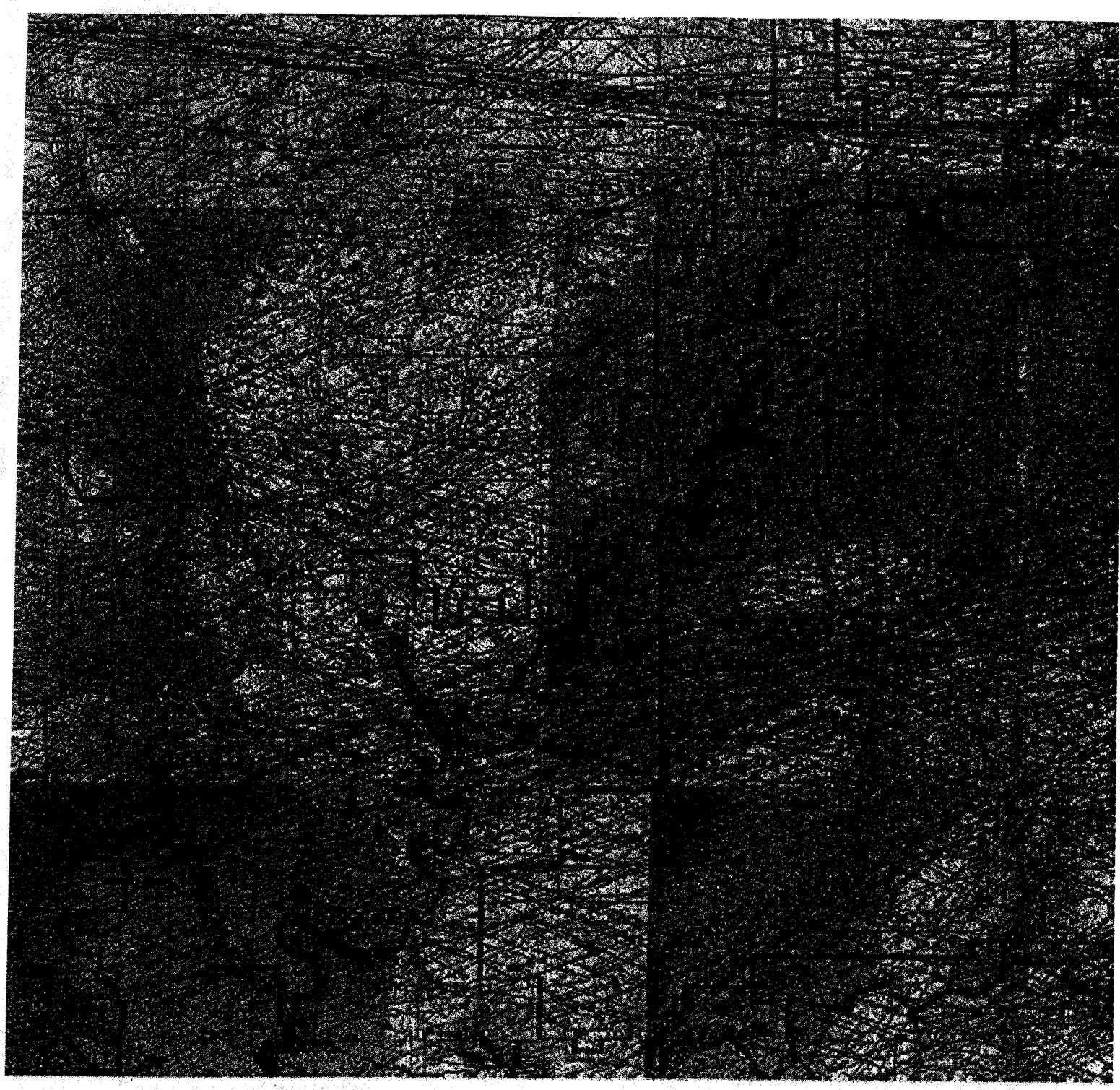
For a recent director of the National Park Service, Roger Kennedy, the very concept of wilderness is spiritual. "That concept is a sense of scale, of human scale, in the presence of larger things and larger matters." He finds that "Wilderness is a sort of physical, geographical Sabbath." Wilderness, he says, "is necessary spiritually."[4]

Jamie Clark, former director of the U.S. Fish and Wildlife Service, advocated for the "spiritual meanings wilderness offers." In *Fulfilling the Promise*, the agency's vision statement for the future of the Refuge System, Clark described refuges as providing "a timeless connection to instincts barely discernible, and a tie to a natural world which nourishes the spirit of individuals,

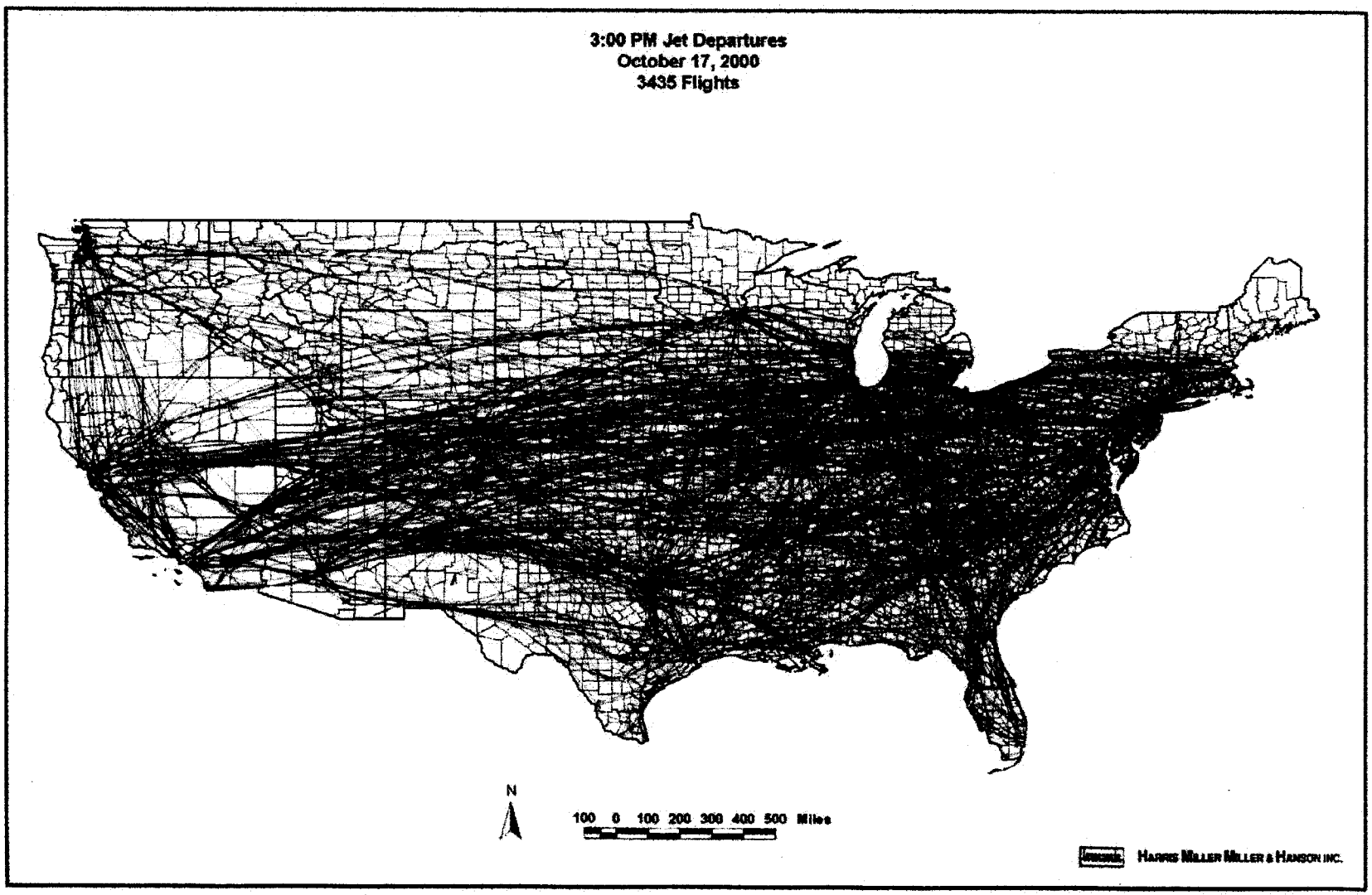
(ATTACHMENT -

N

Figure IV.9 - from FAA Environmental Assessment - cited within (1/30/01)
IFR Flight Paths for Cal Black Memorial Airport
Cal Black Memorial Airport
June 3, 1998



Value – Aircraft Routes (3pm TO's)



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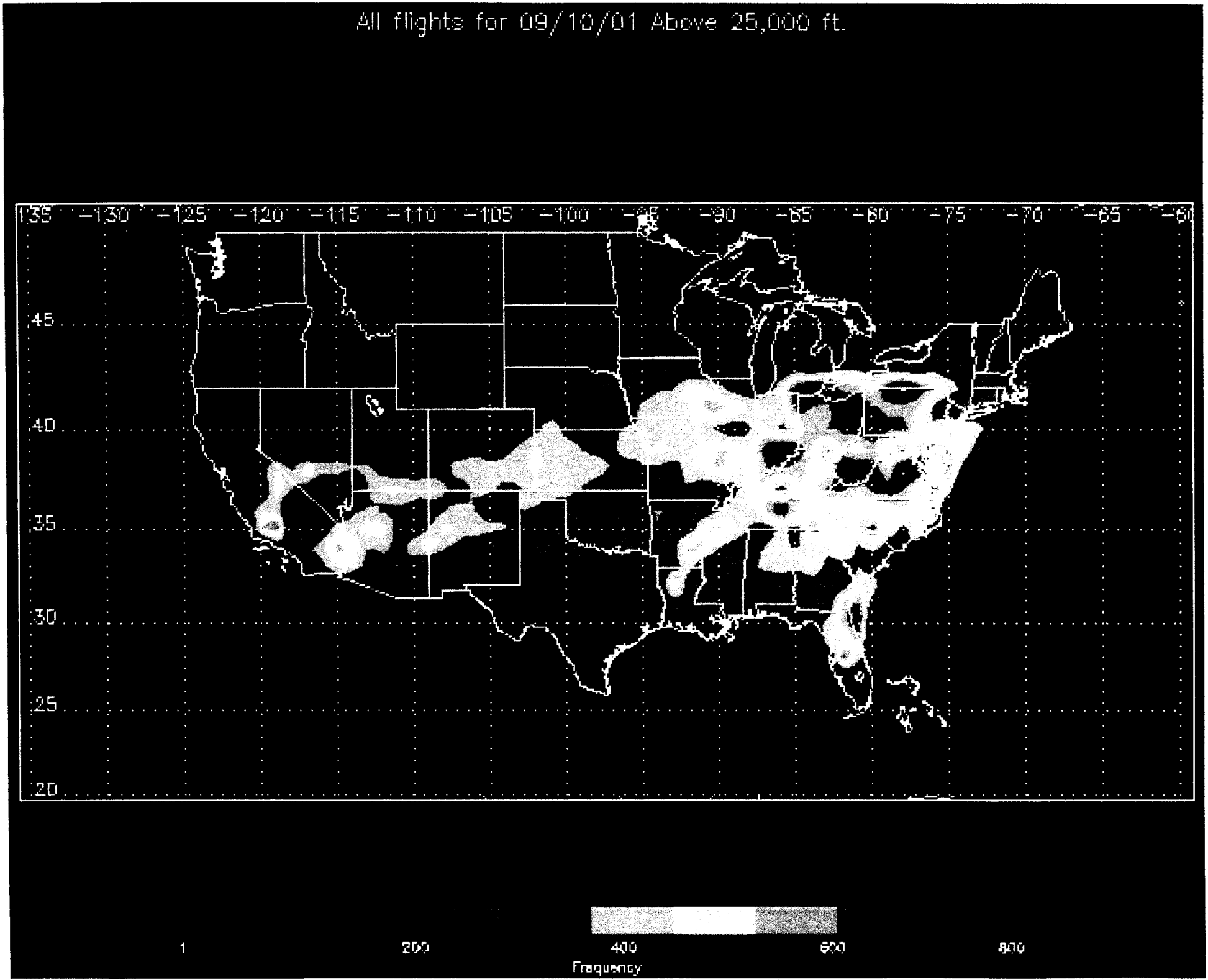

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Aesthetic, Affective, and Cognitive Effects of Noise on Natural Landscape Assessment

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Research has shown that helicopter noise from tourist flights is very common in some national parks and wilderness areas. At Grand Canyon National Park, aircraft noise has been found to be as high as 76 dB(A) with as many as 43 noise events in a 20-minute period. The present study examined the influence of 40 dB(A) or 80 dB(A) helicopter noise on assessment of a popular Grand Canyon vista in a laboratory simulation. Participants (44 female and 36 male undergraduates) viewed 68 slides of scenic vistas and assessed them on naturalness, preference, and scenic beauty and evaluated dimensions of freedom, annoyance, solitude, and tranquility. Compared to a control condition of background natural sounds (e.g., birds, brooks), noise conditions negatively impacted all dependent measures. Although the effects were most pronounced at the 80-dB level, even the 40-dB helicopter noise negatively impacted all dependent variables. Results suggest that helicopter noise interferes with the quality of the visitor experience and even affects the perceived aesthetic quality of landscapes.

Keywords landscape assessment, natural environments, noise, outdoor recreation

Legislation establishing U.S. national parks and wilderness areas has sought both to preserve these assets for future generations and to provide unique recreational opportunities. For example, wilderness areas are designed to provide "outstanding opportunities for solitude or a primitive and unconfined type of recreation" (National Wilderness Preservation Act 1964, Section 2c). Some exhilarating, unique, and unconfined recreational experiences, however, involve the use of tourist aircraft, snowmobiles, or motorized off-road vehicles to explore the preservation areas. Although off-road vehicles impact the physical landscape, aircraft generally do not, and aircraft permit views of the landscape that are otherwise inaccessible to those with certain disabilities.

However, even aircraft generate noise, and one of the primary reasons for visiting a national park, wilderness area, forest or other outdoor recreational environment is to escape the noise found in urban areas (Driver, Nash, and Haas 1987). Escaping noise ranks fourth in importance of sixteen preference domains, after enjoying nature, physical fitness, and reducing tension, by users of wilderness and nonwilderness recreational areas (Driver, Nash, and Haas 1987). Therefore, when sounds that are deemed inappropriate for a given area are encountered, the noise will then be considered annoying and will most likely detract from other important preferred experiences such as the enjoyment of nature and reduction of tension. Noise produced by aircraft in wilderness areas may represent undesirable sounds of

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(cover page only)

by Pico Iyer

Eloquent Sounds of Silence

Everyone of us knows the sensation of going up, on retreat, to a high place and feeling ourselves so lifted up that we can hardly imagine the circumstances of our usual lives, or all the things that make us fret. In such a place, in such a state, we start to recite the standard litany: that silence is sunshine, where company is clouds; that silence is rapture, where company is doubt; that silence is golden, where company is brass.

But silence is not so easily won. And before we race off to go prospecting in those hills, we might usefully recall that fool's gold is much more common and that gold has to be panned for, dug out from other substances. "All profound things and emotions of things are preceded and attended by Silence," wrote Herman Melville, one of the loftiest and most eloquent of souls. Working himself up to an ever more thunderous cry of affirmation, he went on. "Silence is the general consecration of the universe. Silence is the invisible laying on of the Divine Pontiff's hands upon the world. Silence is the only Voice of our God." For Melville, though, silence finally meant darkness and hopelessness and self-annihilation. Devastated by the silence that greeted his heartfelt novels, he retired into a public silence from which he did not emerge for more than 30 years. Then, just before his death, he came forth with his final utterance—the luminous tale of Billy Budd—and showed that silence is only as worthy as what we can bring back from it.

We have to earn silence, then, to work for it: to make it not an absence but a presence; not emptiness but repletion. Silence is something more than just a pause; it is that enchanted place where space is cleared and time is stayed and the horizon itself expands. In silence, we often say, we can hear ourselves think; but what is truer to say is that in silence we can hear ourselves not think, and so sink below our selves into a place far deeper than mere thought allows. In silence, we might better say, we can hear someone else think.

Or simply breathe. For silence is responsiveness, and in silence we can listen to something behind the clamor of the world. "A man who loves God, necessarily loves silence," wrote Thomas Merton, who was, as a Trappist, a connoisseur, a caretaker of silences. It is no coincidence that places of worship are places of silence; if idleness is the devil's playground, silence may be the angels'. It is no surprise that silence is an anagram of license. And it is only right that Quakers all but worship silence, for it is the place where everyone finds his God, however he may express it. Silence is an ecumenical state, beyond the doctrines and divisions created by the mind. If everyone has a spiritual story to tell of his life, everyone has a spiritual silence to preserve.

So it is that we might almost say silence is the tribute we pay to holiness; we slip off words when we enter a sacred space, just as we slip off shoes. A "moment of silence" is the highest honor we can pay someone; it is the point at which the mind stops and something else takes over (words run out when feelings rush in). A "vow of silence" is for holy men the highest devotional act. We hold our breath, we hold our words; we suspend our chattering selves and let ourselves "fall silent," and fall into the highest place of all.

It often seems that the world is getting noisier these days: in Japan, which may be a model of our future, cars and buses have voices, doors and elevators speak. The answering machine talks to us, and for us, somewhere above the din of the TV; the Walkman preserves a public silence but ensures that we need never—in the bathtub, on a mountaintop, even at our desks—be without the clangor of the world. White noise becomes the aural equivalent of the clash of images, the nonstop blast of fragments that increasingly agitates our minds. As Ben Okri, the young Nigerian novelist, puts it, "When chaos is the god of an era, clamorous music is the deity's chief instrument."

There is, of course, a place for noise, as there is for daily lives. There is a place for roaring, for the shouting exultation of a baseball game, for hymns and spoken prayers, for orchestras and cries of pleasure. Silence, like all the best things, is best appreciated in its absence: if noise is the signature tune of the world, silence is the music of the other world, the closest thing we know to the harmony of the spheres. But the greatest charm of noise is when it ceases. In silence, suddenly, it seems as if all the windows of the world are thrown open and everything is as clear as on a morning after the rain. Silence, ideally hums. It charges the air. In Tibet, where the silence has a tragic cause, it is still quickened by the fluttering of prayer flag, the tolling of temple bells, the roar of wind across the plains, the memory of chant.

Silence, then, could be said to be the ultimate province of trust: it is the place where we trust ourselves to be alone; where we trust others to understand the things we do not say; where we trust a higher harmony to assert itself. We all know how treacherous are words, and how often we use them to paper over embarrassment, or emptiness, or fear of the larger spaces that silence brings. "Words, words, words" commit us to positions we do not really hold, the imperatives of chatter; words are what we use for lies, false promises and gossip. We babble with strangers; with intimates we can be silent. We "make conversation" when we are alone, or with those so close to us that we can afford to be alone with them.

In love, we are speechless; in awe, we say, words fail us.

— Pico Iyer

Why WILDERNESS?

As a species, our kind has followed with a vengeance the advice of the Old Testament prophet and "made the crooked straight and the rough places plain." Nowhere has the subjugation of wilderness been undertaken with such fervor as in the United States, where the intellectual baggage of the first white settlers was heavy with Old and New Testament concepts of wilderness and with the Medieval experience of the European frontier. Presently, in the forty-eight contiguous states, protected wilderness is approximately equal to paved surfaces: each occupies about two percent of the total land mass. Wilderness is an endangered geographical species, and our generation has the final say about its continued existence.

Pioneering in the past involved the destruction of wilderness, and it was very successful. Future pioneering should emphasize preservation. Axes and rifles, barbed wire and bulldozers were useful when civilization struggled for a foothold in the wild world. But now it is wilderness that is struggling for existence, and the need is for new tools. Ecological and psychological research into the value of wilderness are the appropriate aids of new frontiersmen.

Such research will show what old-style pioneers could not have been expected to know: Wilderness is not an adversary but an asset; not the enemy of civilization, but a necessary part of it. Yet a philosophy of wilderness has been notable for its absence in the United States preservation movement. We have, rather, witnessed a series of frantic, subjective, and highly emotional defenses. "Save the redwoods!" or "Save Grand Canyon!" we cry. If anyone asks why, there is a sharp intake of breath, a scowl and the reply that it is the *Grand Canyon* we're talking about. But that is not enough. The questions remain: Why save a place like the Grand Canyon, why keep it wild?

Philosophers have spent 2,500 years setting forth the liberal philosophy. So, when Jefferson wrote his famous Declaration or when Lincoln emancipated the slaves or King called for civil rights, few needed to ask "Why?" The value of liberty and equality is well defined. Not so with the value of wilderness. The appreciation of wild places and wild creatures is, after all, barely a century old.

MEDIEVAL VILLAGERS FEARED IT; EARLY SETTLERS SAW IT AS AN OBSTACLE TO FRUITFUL PRODUCTION; 19TH-CENTURY ROMANTICS CALLED IT SUBLIME; MODERN SCIENTISTS MAKE IT THEIR WORKSHOP. APPRECIATION OF WILDERNESS IS RECENT, REVOLUTIONARY, AND INCOMPLETE. ROD NASH MAKES THE CASE FOR A NEW WAY OF LOOKING AT THE WILD.

We should pause for a moment to consider several ways not to defend wilderness. The first is scenery. The problem here is that wilderness is not about scenic beauty, it's about the absence of technological civilization and its controlling influence. Some people do find the absence of civilization "scenic," but many others find it strange, weird, harsh, frightening, and decidedly unlovely. They value it not because it is beautiful but because it is wild. Basing a defense of wilderness on scenic beauty is to leave the case open to all sorts of logical pitfalls. How, for instance, is fire to be accepted as a natural part of a wilderness ecosystem? Using beauty to defend wilderness, in sum, is like saying that only beautiful people are to be accorded rights to exist. We abandoned that tactic long ago in defending human rights, and it is time to question its validity in making a case for wilderness.

Recreation is another sandy foundation for defending wild country. People can and do recreate and generally have fun outdoors in very nonwilderness settings. Camping can be had in KOA campgrounds, and excellent hunting and fishing are available in fenced and stocked compounds. We need to investigate what it is about wilderness recreation that is different and valuable.

A third way not to defend wilderness is by economics, and I say this with the full realization that cost-benefit analyses and the expenditures of tourists have been used repeatedly to justify the existence of parks and reserves. Generally, proponents of the economic argument are interested in offering a countervailing opinion to the developers' calculations of the cash value of natural resources. The problem is that wilderness almost always loses in such figuring. Dollar for dollar, its short-term "benefits" may often be less than those generated by timber, mineral extraction, hydropower, or condominiums. And tourists sleeping in hotels and eating and drinking in restaurants certainly spend more at their holiday sites than wilderness travelers do.

To sharpen these points, I suggest an analogy. Haven't we all one time or another (and usually, it seems, late at night) heard someone ask us, "Why do you love me?" Three reasons that won't be satisfactory are scenery, recreation, and economics!

So why do we love wilderness? Here are seven reasons that are wilderness-dependent, historically valid and shaped by an understanding of both the realities of wilderness and the needs of civilization. They have been refined by our best wilderness philosophers and they constitute the philosophical granite on which the case for wilderness should rest.

1. SCIENTIFIC VALUE. Wilderness is a reservoir of normal ecological and evolutionary processes as well as a kind of biological safe-deposit box for the many forms of life. One variation of this value is quite utilitarian and might be called the "cure-for-cancer" argument. The wild places of the world harbor species presently and potentially important to human welfare and even survival.

But on a less instrumental plane, the scientific argument suggests that humans should refrain from disturbing the evolutionary process. We have already modified the planet enough. When it comes to the existence of species, we should be careful about playing God—in Yellowstone or anywhere else. Perhaps Aldo Leopold put it best in 1949 when he observed that the first law of successful tinkering is to save all the parts. The second law, we are now understanding, is to save the instructions, which are written in healthy, wild ecosystems.

Grosvenor Arch, Cottonwood Wash Road, Grand Staircase–Escalante National Monument. Photo by Stephen Trimble

Civilization created wilderness.

UNTIL THERE WERE DOMESTICATED ANIMALS IT WAS IMPOSSIBLE TO DISTINGUISH THEM FROM WILD ONES. UNTIL THERE WERE FENCED FIELDS AND WALLED CITIES "WILDERNESS" HAD NO MEANING. EVERYTHING WAS SIMPLY HABITAT, WHICH HUMANS SHARED WITH OTHER CREATURES.

With their eyes prehumans bought time to think.

SIGHT, HEIGHT, AND OPENNESS MEANT SECURITY. . . . EDGES OF CLEARINGS AND HEIGHTS OF LAND BECAME FAVORED LIVING AND HUNTING LOCALES. EARLY HUMANS FEARED THE NIGHT FOR THE SAME REASONS THEY FEARED FORESTED WILDERNESS. . . . ONE CHILD DEFINED "WILDERNESS" . . . AS THE DARK PLACE UNDER HIS BED.

2. SPIRITUAL VALUES. For many, wilderness is a temple. Aboriginal people have always regarded places, not just buildings, as sacred. Commonly, these silent sacred spaces where the divine message was most clearly heard were wilderness places. Some have worshiped nature outright, some have found evidence of God in the natural world, and some have simply turned to wilderness as an appropriate place to pray and reflect. Henry David Thoreau and Ralph Waldo Emerson, the American Transcendentalists, believed that nature was the symbol of the spiritual world; John Denver sings about cathedral mountains. Around the world we find that the deserts and open spaces have been the source of many of the world's great faiths. Jesus was not the only religious leader to commune with a deity in the wilderness.

The religious significance many find in wilderness raises the possibility of defending it on the grounds of freedom of worship. This is a basic right in American culture and in many others—even if the congregation whose church is called wilderness may be a minority. Indian spiritual interest in wild places has been recognized in the Native American Religious Freedom Act, although in practice its gains are still small. Hitherto neglected, religious freedom could become a bulwark of non-Indian defense of wilderness.

3. AESTHETIC VALUE. The Romantic movement of the 17th and 18th centuries had a word for it: "sublimity." It involved awe in the face of large, unmodified natural forces and places such as storms, waterfalls, mountains and deserts. Although "scenery" is not a basis for wilderness philosophy, some people find a beauty in the wild that cannot be replicated in pastoral settings, cities, or art museums. If the destruction of beauty is to be avoided, then wilderness should be preserved. We have agreed as a culture to protect irreplaceable art; why not the artless wild?

4. HERITAGE VALUE. Wild country has been a major force in the shaping of character and culture. As a species, we lived in the wilderness a thousand times longer than we have in civilization. In nations like the United States, Canada, and Australia, wilderness has had a very recent and very strong formative influence. The U.S. historian Frederick Jackson Turner pointed to one form when he argued, in 1893, that the frontier experience built respect for the individual and, later, for democratic institutions. We need wilderness, Turner implied, if we are to understand the source of freedom. Wilderness nourishes freedom by permitting people to be different, to escape the controlling force of established institutions. The Puritans in Massachusetts Bay and the Mormons in Utah understood this association. So do contemporary freedom fighters who take to the hills to continue their rebellions.

Wilderness is just as much an historical document as is a collection of manuscripts or books. Losing wilderness means losing the ability to understand our past; it is comparable to tearing pages from a book in the library. Could we go even further and say that people have a right to their heritage, their history? Doesn't the present owe the future a chance to know the past?

5. PSYCHOLOGICAL VALUE. Physical health is not wilderness-dependent; you can become very fit at an urban health club. But wilderness has psychological value based on the contrast it offers to the

environments which most people occupy most of the time. When these civilized environments become repressive, to use a concept the psychologist Sigmund Freud popularized, wilderness offers a unique opportunity for psychological renewal—literally *re*creation. The reason is that our minds developed under wilderness conditions for millions of years. Suddenly in the last few hundred we have been propelled into a world of manmade speed and complexity. For some people occasional relief is a vital mental necessity.

Celebrants of the primitive, from Jean-Jacques Rousseau and his "noble savage" to Edgar Rice Burroughs and Tarzan, have argued that the wild world produces superior human beings. Overcivilization is a real and growing danger. Contemporary therapy programs, such as those of Outward Bound, use the challenges and the peacefulness of wilderness to build self-reliance and self-respect. A wilderness area may well have more psychological importance than hundreds of beds in a mental hospital.

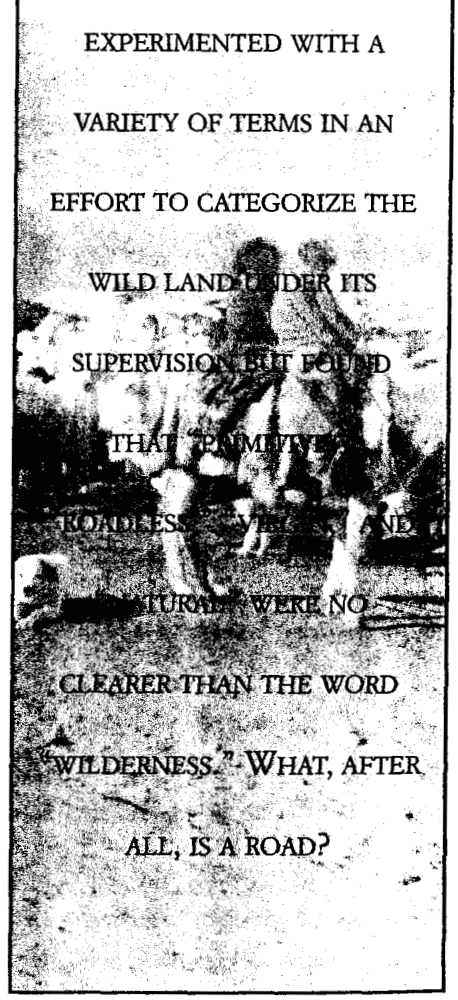
6. CULTURAL VALUE. In the words of Ralph Waldo Emerson, wilderness permits an opportunity for an original relationship to the universe. The wild world is cultural raw material. Artists, musicians, poets and writers have turned to it repeatedly in their quest to shape a distinctive and distinguished culture. In the United States, cultural independence from the Old World did not come until writers such as James Fenimore Cooper and painters such as Thomas Cole began to use wilderness as a setting for their work.

If we preserve it, wilderness can continue to inspire cultural creativity. Without it, we will be reduced to making ever-fainter copies of copies. Indeed, wilderness seems to be associated with the very roots of the creative process. It is no accident that artists and scholars use adjectives such as "pathbreaking" and "pioneering" to describe fresh work. We speak of the "frontiers" of knowledge. The unknown is the primary goad to discovery, and classic wilderness is the unknown. Its presence invigorates a culture, in Henry David Thoreau's terms, as organic material does a barren, sandy field. This is what Thoreau had in mind when he wrote in 1851 about wildness being essential to the preservation of the world.

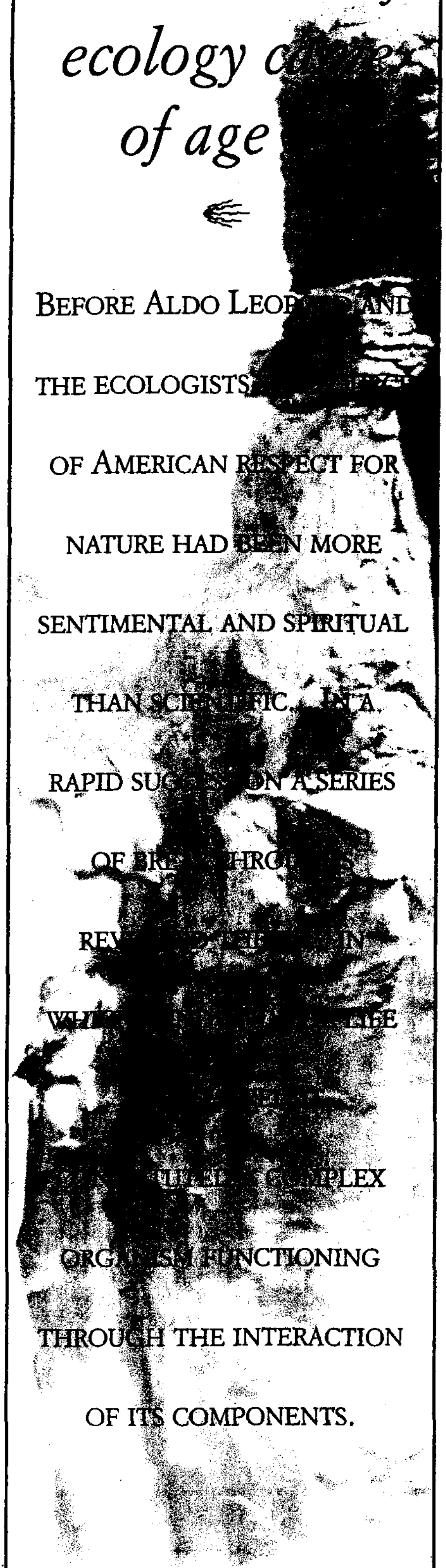
7. INTRINSIC VALUE. The last and least anthropocentric wilderness benefit derives from the very recent idea that nonhuman life and even wild ecosystems themselves have intrinsic value and the right to exist. From this perspective wilderness is not for humans at all. A designated wilderness, in this sense, is a gesture of planetary modesty, a way of demonstrating that humans are members, not masters, of the community of life.

In the last decade, environmental ethics and deep ecology have called attention to the idea that rights, and ethical obligations, do not end with human-to-human relationships but extend to the farthest limits of nature. Americans, especially, should not find this concept strange—our idea of natural rights has continually expanded since 1776. The abolition of slavery and women's liberation are two of the best known moral milestones. Now, with legislation like the Endangered Species Act, we are beginning to recognize the rights of nature. Wilderness, something we neither create nor control, is the best place to learn reverence for all life and to reestablish the sanctity of the earth.

The mental criteria for wilderness are as important as the physical.



The science of ecology [illegible] *of age*



BEFORE ALDO LEO[illegible] THE ECOLOGISTS [illegible] OF AMERICAN [illegible] FOR NATURE HAD [illegible] MORE SENTIMENTAL AND SPIRITUAL THAN [illegible] A RAPID SU[illegible] SERIES [illegible] COMPLEX [illegible] FUNCTIONING THROU[illegible]H THE INTERACTION OF IT[illegible] COMPONENTS.

A wave of criticism has washed over wilderness in the past few years. In 1995 a major essay in the *New York Times* called designated wilderness and national parks unnatural, irrelevant, and old-fashioned. Some allege that wilderness is politically unsustainable, merely a playground for the wealthy, and almost always white, First World recreationists.

The basic concern of these critics is that wilderness accentuates the separation of humans and nature, perpetuating the old dualistic fallacy that we are different from and better than everything else. And, because people are only visitors in designated wilderness areas, they can't be models for sustainable co-existence with the rest of creation.

A rebuttal to these arguments should begin with the idea that wilderness and its preservation are not the cause of dualism but rather the symptom. Technological civilization is the real disease. Sure, humans are part of nature, but somewhere along the evolutionary way, we dropped off the biotic team. Maybe it was 15,000 years ago when herding and agriculture (and settlement) replaced hunting and gathering. Or the middle of the 20th century when more humans occupied the planet at one time than had ever existed in the entire history of the species. Maybe it was when the normal rate of species extinction increased 10,000 times as a result of human impact. Maybe it was August 6, 1945.

The point is that as a result of our sheer numbers (5.8 billion and counting at the rate of 10,000 new human lives each hour), our unprecedented technological power, and our lack of an ethic that embraces the environment, we are no longer thinking or acting like a part of nature. Or, if we are a part, it is a cancerous one, growing so rapidly as to endanger the larger whole. Our species, in a word, is a terrible neighbor to the 30 million or so other species that share this planet. Right now we desperately need a "time out" to learn how to be team players; we need to learn how to live responsibly in the larger community called the ecosystem.

What wilderness provides is precisely this "time out." Its presence reminds us of just how far we have separated from the rest of nature. In wild places we stand naked of the civilized habitat our technology has created, open to seeing ourselves once again as large mammals totally dependent on the health of our environment. We learn gratitude, humility, and dependency. We are reminded of the old ways that nourished us both ecologically and psychologically for so long.

In a pre-ecology age, Thoreau was more correct than he knew about the critical importance of wildness and wilderness to the preservation of the world. In the wilds we comprehend that in the big picture and over the long run security does not come from controlling and exploiting nature. The fundamental revelation of this first century of ecological science is that human well-being is inextricably linked to the health, diversity, and normal functioning of the global ecosystem. The corollary is that our numbers and our technology are wreaking ecological havoc. *Homo sapiens* is the prime mover behind what is being now called a Sixth Global Extinction: another massive dieback that will change the course of evolution and most likely in ways unfavorable to the continuation of life forms like ours. Only this sixth time the disruptive influence is not an extraterrestrial death star like that which destroyed the dinosaurs. We are the death star. The good news is that unlike the earlier cosmic debris, we can control this threat because it is our thought and behavior.

This is where wilderness assumes not only ecological but philosophical value. Because this is land we don't "use" or "own," we are open to perceiving its intrinsic value. In wilderness our species better understands the rights of other species to a place on the planet. Because we don't dominate, we discover the necessity of sharing which was, after all, the basis of kindergarten fair play. Unselfishness, on the species level, remains the key to effective global environmentalism. We call it biocentrism, and we learn it in wilderness. Wild places remind us that the earth does not belong to us; it's the other way around.

Moreover, wilderness preservation demonstrates an encouraging capacity for self-restraint on the part of a species notorious mostly for its appetite. National parks and wilderness preserves represent self-imposed limits on our capacity to conquer, exploit and destroy nature. In setting aside wilderness, we forego economic gain; we refrain from building roads and buildings; motor-powered vehicles stay outside. We even leave mountain bikes behind. So wildernesses are the best places on which to build a legacy of limitation. In them we learn that less can be more. And even if we don't go in, the very existence of wilderness today proves that we can set and stick to limits. Preserved wilderness is the starting point for putting our species' needs into ecological balance with those of our fellow travelers on spaceship Earth.

Invented in the United States, the national park idea has been called the best one we ever had. But the parks may be a better idea than we ever knew. A great biological and intellectual healing could begin in protected wild places. Properly managed and interpreted, designated wilderness could give us the inspiration to live responsibly and sustainably elsewhere. However, if we dilute the wildness of these places, if we make them more like the environments we have compromised, we diminish their educational and inspirational significance.

Long ago, Moses went into the wilderness and came out with a code of moral principles that we call the Ten Commandments. It's time to go back and see what he left behind. The wilderness still holds a commandment concerning ecological morality. If we can find that tablet, and live up to it, this classified "personals" advertisement that my students wrote might yet get a meaningful response:

> TEMPERATE BUT ENDANGERED PLANET. ENJOYS WEATHER, CONTINENTAL DRIFT, PHOTOSYNTHESIS, EVOLUTION. SEEKS CARING RELATIONSHIP WITH INTELLIGENT LIFE FORM.

Maybe it could still be us! Maybe mankind is not a malignant part of the ecosystem after all. If we could use parks and reserves to cure the planetary cancer of our unrestrained growth, we would give fresh new meaning to Wallace Stegner's 1960 characterization of wilderness as "the geography of hope."

Roderick Frazier Nash, Professor Emeritus of History and Environmental Studies at the University of California, Santa Barbara, is one of the creators of the new field of environmental history. His books include the classic *Wilderness and the American Mind* (third revised edition 1982), which has been ranked among the most significant environmental books published in the 20th century. Professor Nash has also written *The Rights of Nature: A History of Environmental Ethics* (1989).

Why We Must Supplement DNL Noise Analysis

By

William Albee ~ Special Projects Director
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May 2002

Is the Day/Night Average Noise Level (DNL) metric truly as flawed as many citizens believe? Or does it serve its intended purpose of defining noncompatible land use areas and setting boundaries for noise mitigation measures quite well, but fail in communicating noise exposure to the average citizen? Perhaps what is needed is a better way to communicate noise exposure in terms that are more easily understood. Supplemental analysis, using noise metrics in addition to DNL, may be the answer!

This article examines these questions in the context of the origin of the DNL metric as the primary descriptor of community noise exposure, its role in the planning and administration of noise mitigation programs, and its shortcomings in describing noise impacts to the public. Better communication and understanding of noise exposure is not the end objective, but rather a means by which affected citizens, aviation officials and government authorities can come together at the local level to more effectively address their specific noise problems.

Go to any community meeting with airport noise on the agenda, and you will likely hear vigorous citizen complaints that DNL does not adequately communicate noise exposure to citizens who reside near airports or live under flight paths, particularly those who reside outside the airport's published DNL noise contours. You will likely hear the complaint that the Federal Government threshold for compatible land use, set at DNL 65 dB, is too high. When officials respond by defending DNL, citizens usually counter that they don't hear averages – they only hear individual aircraft. Most people find it very difficult to translate the individual noise events that add up over the typical day into an average noise level. This confusion leads to mistrust and the conclusion that DNL understates the noise that many citizens experience.

These views are legitimate and are strong indicators that aviation officials need to find better ways to communicate noise impacts; yet in the process, preserve the vital role DNL plays in administering Federally funded noise mitigation programs.

DNL Background

Before examining the application of various supplemental metrics to this problem, it is important to review the background and use of the DNL metric. The DNL 65 dB guideline was recommended in 1980 by the Federal Interagency Committee on Urban Noise (FICUN), and reaffirmed in 1992 by the Federal Interagency Committee on Noise (FICON).

The origin of DNL as the metric of choice for defining community noise exposure can be traced even further back in time. In 1974, EPA released a publication entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety*, EPA Report No. 550/9-74-004, also known as the *Levels Document.* This document states: *"In order to describe the effects of environmental noise in a simple, uniform and appropriate way, the best descriptors are the long-term equivalent A-weighted sound level (L_{eq}) and a variation with a nighttime weighting, the day-night average sound level (L_{dn})."* It is important to point out the following disclaimer printed on the cover page of the document, which states: *"This document has been approved for general availability. It does not constitute a standard, specification, or regulation."*

When the DNL 65 dB threshold is discussed in public meetings, reference is often made to the DNL 55 dB noise level recommended by EPA in the Levels Document to limit outdoor activity interference and annoyance in residential areas. Many people believe that if Congress were to restore funding to the EPA Noise

wyle laboratories

(cover page only)

Federal Interagency Committee On Aviation Noise

The Use of Supplemental Noise Metrics in Aircraft Noise Analyses

February 2002

The Federal Interagency Committee on Aviation Noise (FICAN) has a long-standing interest in the use of supplemental metrics to describe the impacts of aviation noise. The Federal Interagency Committee on Noise (FICON) that called for the creation of FICAN recommended that FICAN address this issue. In February 2001, FICAN held a public forum on the use and application of noise metrics to supplement Day-Night Average Sound Level (DNL). At that symposium, a panel of representatives from airports, community groups, and industry presented their perspectives on the need for supplemental metrics, methods for evaluating their usefulness, and recommendations for the types of metrics that should be applied in different situations.

FICAN finds that supplemental metrics provide valuable information that is not easily captured by DNL.

INTRODUCTION

The Federal Interagency Committee on Aviation Noise (FICAN) has a long-standing interest in the use of supplemental metrics to describe the impacts of aviation noise. This interest extends at least to the Federal Interagency Committee on Noise (FICON) Report of 1992[1]:

> "The Schultz curve relating DNL to the percent of highly annoyed is generally accepted as a valid criterion for noise impact and has been re-validated by recent analyses (Fidell et al. 1989; Finegold et al. 1992). There are however, no other validated impact criteria related specifically to sleep or speech disturbance or criteria related to short-term impacts associated with supplementary metrics." (FICON, Section 3.7).

The FICON report included a recommendation that FICAN address this issue. Since FICAN was formed in 1994, a great deal of work has been done in the area of sleep disturbance, and FICAN has developed a position and recommended sleep disturbance curve (FICAN, 1997). However, FICAN has not developed criteria for evaluating other short-term noise impacts through the use of supplemental metrics (e.g., Sound Exposure Level, SEL, and Time Above, TA).

In February 2001, FICAN held a public forum on the use and application of noise metrics to supplement DNL. The members of the panel included: David Southgate of the Australian Department of Transport and Regional Services; Mr. Mark Myles of the Hanscom Field (Bedford, MA) Noise Workgroup; and Mr. Vincent Mestre of the Consulting Engineering Firm Mestre Greve Associates (Newport Beach, CA). Their presentations can be found on the FICAN web site (www.fican.org).

This paper presents a summary of the issues presented at the symposium, and FICAN's findings on the subject.

EFFORTS IN AUSTRALIA TO EXPLAIN AIRCRAFT EXPOSURE

David Southgate, Director Sydney Environment, Airports
Federal Department of Transport and Regional Services, Australia

In 1994 strident public claims were made that Australia's noise contouring system – the Australian Noise Exposure Forecast (ANEF) System – had failed in predicting the noise exposure patterns from a new runway at Sydney Airport. These claims were essentially endorsed by the findings of a Senate Select Committee in 1995.

The Department of Transport and Regional Services ("the Department") released its Discussion Paper *Expanding Ways to Describe and Assess Aircraft Noise* in March 2000 in an effort to encourage debate on finding better ways to describe aircraft noise exposure patterns to the public and decision makers. In essence, the Department is proposing that conventional equal energy noise contours only be retained for purposes where a 'line' based on community reaction needs to be drawn – for example, when defining eligibility areas in land use planning

[1] FICAN itself was formed on the basis of a recommendation from the FICON report.

(Cover page only)

FICAN Federal Interagency Committee on Aviation Noise

About FICAN Activities Research Publications News More Info

FICAN Symposium on the Value of Supplemental Noise Metrics in Aircraft Noise Analysis

Year 2001 International Airport Noise Symposium
February 28, 2000
San Diego, California

Summary of Symposium (pdf, 760 kb)

Agenda

Speaker(s)	Topic	Presentations
FICAN Moderator	Introduction	(slides, 576 kb)
David Southgate Airports Operations Department of Transport and Regional Services Australia	Expanding Ways to Describe and Assess Aircraft Noise	(Paper) (slides, 750 kb)
Michael Bahtiarian Mark Myles Hanscom Field Noise Work Group Bedford, MA	Noise Metric Recommendations from the Hanscom Field Work Group	(Paper) (slides, 338 kb)
Vince Mestre, P.E. Mestre Greve & Associates Newport Beach, CA	Use of Sound Exposure Level Contours and Time Above in Airport Noise Analyses	(slides, 650 kb)

General Discussion (mpg)

"Have you considered overlaying N70 on flight path movements map?"

"Does it make more sense to stick with DNL and explain that these kinds of metrics are actually component parts of DNL?"

"Can the N70 contour be readily updated in the same way ANEF contours are updated?" "How do you apply supplemental descriptors to a Master Plan Update?"

"Wouldn't N70 and TA metrics unfairly penalize general aviation aircraft?"

"I am distressed that that we are still supporting any kind of averaging metric." "There is actually tremendous variability of underlying data.."

"There isn't one metric, but a suite of noise metrics to address all of the different kinds of issues.

"Getting FAA to be more flexible about using supplemental metrics"

The Spiritual Dimension of Wilderness:

A Secular Approach for Resource Agencies

Roger Kaye

September 18, 2002

Wilderness and the Human Spirit:
A Secular Approach for Resource Agencies

Introduction

> *All of us have the task of making a living; but we long for something more, something that has a mental, a spiritual impact on us. . . . if we are going to amount to anything as a great country we must give serious attention to our mental and spiritual needs – hard to define but of greatest importance*[1]

These words by the preeminent field biologist and wilderness proponent Olaus Murie reflect a theme that resonates through American wilderness writing: Beyond utilitarian and commodity needs, our natural landscapes serve needs that lie at the core of the human psyche – in the elusive realm of human experience described as the spiritual dimension. This was the recurring message of the earliest proponents of wilderness, most notably Henry David Thoreau and John Muir. It was espoused by scientists Aldo Leopold, Robert Marshall, and Sigurd Olson, who, with Murie, were instrumental in launching the wilderness movement. Howard Zahniser, chief author and lobbyist for the Wilderness Act described it as "the characteristic effect of an area we most deeply need to provide for in our [wilderness] preservation program."[2]

The power of spiritual values to capture the public imagination has not been missed by political leaders and public land managers at the highest levels. Consider the words of former Vice President Al Gore, in his book, *Earth in Balance: Ecology and the Human Spirit*:

> The twentieth century has not been kind to the constant human striving for a sense of purpose in life. . . .We retreat into the seductive tools and technologies of industrial civilization, but that only creates new problems as we become increasingly isolated from one another and disconnected from our roots . . . more people than ever before are asking, "Who are we? What is our purpose?"[3]

For a recent director of the National Park Service, Roger Kennedy, the very concept of wilderness is spiritual. "That concept is a sense of scale, of human scale, in the presence of larger things and larger matters." He finds that "Wilderness is a sort of physical, geographical Sabbath." Wilderness, he says, "is necessary spiritually."[4]

Jamie Clark, former director of the U.S. Fish and Wildlife Service, advocated for the "spiritual meanings wilderness offers." In *Fulfilling the Promise*, the agency's vision statement for the future of the Refuge System, Clark described refuges as providing "a timeless connection to instincts barely discernible, and a tie to a natural world which nourishes the spirit of individuals,

and a nation."[5]

The former chief of the U.S. Forest Service, Jack Ward Thomas was equally candid in recognizing "the nature-based values and experiences that serve to renew and fulfill the human spirit." In a Forward to the recent text *Nature and the Human Spirit: Toward an Expanded Land Management Ethic,* Thomas recognized the "spiritual benefits the public lands can provide," and unequivocally endorsed Forest Service policy that ecosystem management must include consideration of the emotional, mental and spiritual well-being of people.[6]

Thomas's embracing spiritual values may seem surprising from the former head of an agency known for its utilitarian, commodity orientation. But recent research undertaken by the Forest Service – motivated in large part by political and legal actions taken against the agency for not considering the full range of forest values – has documented what National Forest Service Environmental Psychologist Herbert Schroeder has described as a shift toward greater public concern for the spiritual values of national forests.[7] A major study by Forest Service researchers David Bengston and Zhi Xu corroborates Schroeder's findings, and concludes that understanding spiritual values "may be a key to better understanding the intensity of conflict surrounding the management of the national forests."[8] Schroeder recognizes the difficulty in measuring and describing spiritual values. "Yet it is precisely these kinds of values, rooted in intuitive and emotional experience," he says, that "must be recognized and dealt with in managing forests."[9]

The Problem

While spiritual associations with wilderness are often abstractly "recognized" by agency heads, they are seldom operationalized at the field level. The spiritual dimension is usually relegated to the background of wilderness stewardship, often alluded to, but seldom incorporated in planning, management, and educational programs. One searches the current wilderness policies of the four wilderness managing agencies in vain for any specific notion of how spiritual values will be accommodated. Why is this? Why aren't such widely acknowledged values recognized in policy, considered purposeful elements of wilderness stewardship, and accorded specific protective provisions?

One reason is the dominant commodity and scientific paradigms in which most managers were trained and that have historically guided resource management. Those paradigms focus on tangible and instrumental features of the environment and emphasize a utilitarian approach to "resources." In terms of recreation, (the field most commonly associated with the spiritual dimension of Wilderness) these paradigms emphasize setting attributes that facilitate visitor goals and activities. They scarcely recognize the underlying – and often unconscious – needs, motivations, and desires that ultimately drive visitors' participation. These factors are often aligned with emotion, an element of our humanity avoided by managers who mistakenly view it as incompatible with the legal and scientific milieu in which they must make and defend their decisions. These dominant paradigms from which agencies work often ignore non-use values

entirely. This narrow perspective makes it difficult for many managers to grasp a fact central to spirituality – that some of the values and benefits associated with an environment do not derive from how it can be used. Rather, they arise from what it represents symbolically, the meanings it has come to hold and connect people to.

What is the nature of this realm of perception and experience? Why has it been such a powerful motivation for protecting Wilderness? How can wilderness managers accommodate, protect, and perhaps promote conditions conducive to spiritual experience or orientation?

Such questions stimulated this exploration. The effort is troubled by a nagging sense that the spiritual realm should be left alone, unstudied, unexamined . . . mysterious. After all, part of the mystique of the spiritual dimension of the wilderness experience is owed to its aura of unknown. And the effort is humbled by the knowledge that some of the giants of the wilderness movement considered their understanding and writing inadequate to the task of explicating what Aldo Leopold described as "values as yet uncaptured by language."[10] Olaus Murie also wrote of the difficulty of defining such concepts, though he was hopeful that in "a few centuries hence our language will be such that we will be able to define such ideas in words."[11]

But we do not have a few centuries, or even decades. Remoteness, once the shield of wilderness from erosive influences, is no longer a protective barrier. Today, no wilderness area, not even Murie's Brooks Range, is far enough from new technologies, economic interests, public demands, and agency actions that may threaten qualities conducive to the symbolic and experiential functions of Wilderness related to spirituality. These historic functions of Wilderness will continue to the extent they can be weighed fairly against competing values. Operating within a science-based paradigm, managers need an understanding of spirituality that is grounded in, or at least compatible with, scientific findings. They need to understand the role it has played and continues to play in the evolving wilderness ethic. They need to understand how spiritual values serve today's needs and desires, and why many believe they will become ever-more important to future inhabitants of our ever-more distracted Earth. It is the purpose of this paper to help provide these understandings.

Spirituality and the Question of Separation of Church and State

Perhaps the greatest barrier to agency accommodation of spiritual values is the common association of spirituality with a Divine Being, thus implying a connection to doctrinaire religion or supernaturalism. In American culture, spirituality has become heavily freighted with connotations of cathedrals, stained-glass windows and biblical images. This association can be traced, in part, to the religious origin of the word. The word "spiritual" was first found in the writings of the Apostle Paul and was used in the context of a person "under the influence of the Spirit of God."[12] In the context of wilderness, this is reinforced by the biblical phraseology of the early wilderness philosophers such as Muir and Thoreau, and their frequent reference to "the creator." As summarized by Bev Driver, "wilderness appreciation . . . began with the

revolutionary idea that the least modified environments were the purest expressions of God's power and glory"[13] Thus it shouldn't be surprising that many wilderness managers mistakenly limit the spiritual orientation to the realm of theology, rather than seek understanding from the discipline that is central to this subject: psychology.

Managers must understand that the Christian concept of God is not the sole or even the predominate context of the term today. If it were, spirituality would not be a legitimate concern of public agencies. Government references to it would inevitably be challenged in court, interpreted as a violation of the first amendment to the Constitution mandating separation of church and state. The constitutional requirement that "Congress shall make no law respecting an establishment of religion" is a mandate for government neutrality toward any particular religion. Government agencies may not endorse, promote, affiliate with, or discriminate against any religious organization or doctrine. [14]

But as legal scholar Jennifer Friesen has documented, religion is not the primary context in which the spiritual values attributed to wilderness are expressed and experienced today. Thus, agency accommodation of spiritual aspects of wilderness is not subject to injunction of the first amendment. Acknowledging that many people equate spirituality with religion, Friesen points out that from a legal standpoint, they are not in fact synonymous. Religions constitute only some of the manifestations of a broader spectrum of spiritual belief and experience. Agency actions that accommodate or promote spiritual values fall within this broader definition (and thus stay within the constitution) if they act for what Friesen refers to as "public reasons." Public reasons are reasons that "could be accepted by individuals from a diversity of [religious] faiths or no faith as all." [15]

Fitting comfortably within this prescription is Friesen's interpretation of the Forest Service's use of spirituality:

> . . . a longing for transcendence through connection with something infinitely larger and more permanent than ourselves; a reverence and wonder for something we can never reduce to mere data; or renewal of the human spirit . . .

Freisen's analysis of the first amendment and case law concludes that there is no constitutional prohibition for managing federal lands in a way that serves these deep human needs. She concludes that

> The government does not cross the boundary between church and state when it teaches that our ultimate interconnectedness impels a protective and respectful ethic toward public lands, or when it facilitates the use of the land by private citizens to realize complex, nature-based values that they already hold or that they discover there.[16]

Understanding the Spiritual Dimension Through Psychological Perspectives

The definitional problem: In popular usage, the word "spirit" expresses a wide diversity of meanings. Webster's dictionary, for example, lists 14 meanings of the word, ranging from "an activating or essential principle influencing a person" to a "God" to an "alcoholic beverage." Webster's ascribes the origin of the word to the Latin word *spiritualis,* meaning "of breathing, or wind." The metaphor of moving air serves well to represent how "spirit" is most often used in the popular wilderness literature. Universally, the spiritual dimension is described as a presence that can be felt, but not seen or fully grasped. It is elusive and ineffable; attempts at definition or description often begin with a disclaimer that it is beyond the reach of words, that it cannot be adequately captured by the tools of science. Thus, it is not surprising that no widely agreed-upon definition has emerged to serve wilderness stewards.

But agencies need such a definition if they are to recognize and protect conditions conducive to one's spiritual experience or orientation toward wilderness. They need a definition that fits within, but extends, the science-based approach to resource management. This paper is an exploration of a number of fields of historical, empirical, and theoretical research that the author felt are most useful in developing such a definition.

These fields include:1) the psychology of religion and comparative religion, 2) clinical and health psychology, 3) leisure and wilderness recreation, 4) evolutionary psychology and neurophysiology, 5) humanistic psychology, and 6) the formative literary and artistic representation of wilderness.

All but the last of these disciplines approach spirituality as a secular, psychological phenomena. Their various perspectives support an underlying premise of this effort:

> All human spirituality is based in psychological processes comprised of innate and socially constructed elements that evolved and continue to evolve in response to human needs and desires.

As opposed to theological perspectives, this psychological/evolutionary approach does not attribute spirituality to divine, supernatural, or paranormal influences (although it does not refute the possibility of such influences). It assumes that spiritual forces do not inhere in a landscape. Rather, the landscape serves as a medium, a conduit, through which one connects to some predispositions that are rooted in what one brings to the experience. One brings to the Wilderness a complex interaction of 1) beliefs, attitudes, and expectations learned through individual and group experience and as a member of American culture, and 2) a genetic heritage, comprised of one's unique genetic makeup, laid down upon the universal human genotype developed in synergetic evolution with the natural world. Ultimately, one finds no meaning or message in Wilderness that wasn't brought with in the first place.

Human spirituality, of which the wilderness ethic is but one manifestation, is a way of

perceiving, knowing, and experiencing that is complex, multi-faceted, multi-dimensional. Hence, no single disciplinary perspective is adequate to provide holistic understanding. In the following pages we will consider the definitions, empirical findings and theoretical perspectives from several disciplines that were drawn upon to synthesize this definition:

> The Spiritual Dimension of Wilderness: The capacity of a landscape to support or evoke the experience of, or orientation toward, an ultimate value larger than the self that enhances the meaning and purpose of one's life. This capacity results from the interaction of a set of meanings the individual has learned and ascribes to the setting, and an innate human predisposition to seek connection or relatedness to an ultimate reality.

Psychology of Religion and Comparative Religion

As research disciplines, the concern of these fields is not whether the object of spirituality is a God, an entity like the Earth, or a universal force such as the creative process of evolution. Nor is its concern the doctrinaire, ritualized, or political aspects of religious organization. We must emphasize the difference between religion and the spiritual dimension that is the concern of the psychology of religion. Consider one psychologist's distinction: "The term *religion* has come to signify for many the codified, institutionalized, and ritualized expressions of people's communal connections to the Ultimate . . . *spirituality* is a deep sense of belonging, of wholeness, of connectedness, and of openness to the infinite."[17] Religious systems provide important understanding of the function of spirituality, but they represent only one subset of the phenomena.

The contribution of this field to our concern can be summarized as the understandings it provides regarding 1) the common characteristics of the spiritual experience, orientation, or way of being, 2) the common factors that contribute to it, and 3) the common benefits derived from it.

Cross-cultural research into the psychological elements and functions that are nearly universal to religious systems is particularly relevant because universality strongly suggests (though does not prove) an innate basis. It is also important because the historic roots of the wilderness preservation movement lie in religious systems of thought and belief. The American concept of Wilderness began with transcendentalists such as Ralph Waldo Emerson, Henry David Thoreau and later romantic naturalists such as John Muir whose philosophies developed from childhood Christian faiths. Although they later rejected religious doctrine, their vocabulary of expression remained religious in tone and voice. Their frequent reference to Wilderness as a temple or cathedral echoes through the current popular literature. The inspiration they found in Wilderness, and the means by which they found it, parallels the experience of the leaders and prophets of most world religions.

For example, in the Judeo-Christian tradition, Jesus found spiritual catharsis during a symbol-laden 40-day wilderness sojourn. The prophet Elijah likewise spent 40 days in wilderness to find

enlightenment and guidance. In the remote wilderness of Mt. Sinai, God chose to reveal himself and his guidelines for proper living to Moses. Mohammed traveled to a distant mountain cave to receive his spiritual message from the angel Gabriel.

However, it should be noted that while Thoreau, Muir and many other founders of the wilderness movement similarly found retreat to the wilderness beneficial, their wilderness philosophies actually borrowed more heavily from Asian religions. The Judeo-Christian emphasis on the separateness of man, and the biblical injunction for man's dominance over other creatures was largely rejected in favor of the harmony and unity with nature emphasized by Hinduism, Taoism, and Buddhism. But while the underlying assumptions of Western and Eastern religions are vastly different in regard to humans' relationship to nature, they share an important commonality.

Findings from the psychology of religion suggest this commonality to be a universal human predisposition. This universality is apparent in the definitions of three authorities:

> Spirituality is a process by which individuals recognize the importance of orienting their lives to something nonmaterial that is beyond or larger than themselves . . . so that there is an acknowledgment of and at least some dependence upon a higher power, or Spirit.[18]

> At its core, spirituality consists of all the beliefs and activities by which individuals attempt to relate their lives to god or to a divine being or some other conception of a transcendent reality [19]

> Spirituality: a way of being and experiencing that which comes about through awareness of a transcendent dimension and that is characterized by certain identifiable values in regard to self, others, nature, life and whatever one considers to be the Ultimate [20]

At this point it is worth noting the similarity between these research-based definitions of spirituality and Wilderness Act author Howard Zahniser's description of a seminal benefit of Wilderness. Zahniser described Wilderness as providing

> an awareness of our human existence as spiritual creatures nurtured and sustained by and from the great community of life that compromises the universe; of which we ourselves are a part[21]

Robert Emmons' authoritative study *The Psychology of Ultimate Concerns: Motivation and Spirituality* emphasizes the centrality and universality of the common core element of all these descriptions: a transcendent dimension in relation to the notion of some ultimacy.[22] Ultimacy refers to that which is perceived as of greatest and most enduring importance. It is what across cultures and throughout time has been conceived of as something "external and independent of us," an "infinite" or a "beyond."[23] In the Judeo-Christian tradition this "something" has been

personified and represented as a divine being. But in many other world religions the "object" of belief is less tangible. In the contemplative traditions, such as Buddhism and Taoism, it is a striving toward a self-diminishing unitive state. It is a oneness with what Thoreau referred to as the "cosmos." In preliterate tribal cultures it often takes the form of striving for harmony with an animistic system of spirits that comprise and order the natural world.

But from the perspective of psychology, the essence of spirituality is not the focal entity but rather the personal transcendence that occurs in relation to it. A transcendent orientation replaces the self as the "ultimate" with a sense that the self is part of a larger, greater, more enduring reality. It places one within a broader frame of reference, which could include one's community, all of humanity, or even the Earth. It could include the sense of being a member of the community of life as popularized by Aldo Leopold and referenced throughout the popular wilderness literature. It could be the more intense sensation Robert Marshall described, "of being part of an immensity so great that the human being who looks upon it vanishes into utter insignificance."[24] Regardless of the frame of reference, lessening of the ego and humility are implicit in transcendence. Transcendence is characterized by transformation, change, and enlightenment; people find new or expanded perspectives that enlarge their identity. They see their lives within the larger scheme of things. Thus, Emmons describes the spiritual core of transcendence as "strivings that are oriented above and beyond the self."[25] Further, this transcendent perspective influences one's behavior. Thus A. Helminiak's work, *The Human Core of Spirituality* defines transcendence as "the sense that something in life goes beyond the here and now and the commitment to that something."

Clearly, transcendence is more than a recognition of some primacy beyond the self; it requires something of the individual. Historically, religions have required subordination of the ego and pride. They have required some degree of sacrifice as an expression of commitment. The Wilderness ethic similarly requires humility and sacrifice in the form of restraint. In the Wilderness one must use leave-no-trace-practices. One must forgo certain conveniences and technologies, even when their use might not tangibly effect the Wilderness. As in a church, some things are avoided simply as a gesture of respect.

In their various forms, religious systems provide a transcendent framework of meaning by which a person understands his or her life and acquires insights into their personal existence. Thus, cognitive psychologist Mihaly Csikszentmihali finds that common to all religions throughout history is the need for the feeling "that one belongs to something greater and more permanent than oneself."[26] Similarly, the standard text, *The Psychology of Religion,* describes religions systems as serving the transcendent "need to locate and understand who we are in the scheme of things."[27]

Doctrinaire and theological explanations for this need are innumerable and diverse. But the pioneering psychologist of religion William James theorized a widely recognized universal motivation for religious systems that complements the findings of therapeutic psychology that we will consider next: discontent or disharmony that arises from the great existential questions of

life – and their resolution through attaining a sense of relatedness to some meaningful ultimacy.

Where did we come from? Is there meaning and purpose to our life? How do we relate to the larger world? Is there some part of us that continues after we die? Evidence from the fields of mythology, anthropology, and most recently, cognitive archeology suggest these concerns have been with our species longer than recorded history.[28]

Perhaps as some neuroscientists speculate, existential concerns arose with the development of human consciousness. Perhaps the belief (or recognition) that we are a part of a larger reality evolved to lessen the effect of the troubling realization that we die. Perhaps the belief that some aspect of us has meaning beyond our short lifetime provided a survival advantage by enhancing our ancestors' psychological outlook.

We will later consider evidence from the evolutionary sciences that suggests how and why religious systems evolved to meet the existential uncertainties that arose from the development of human consciousness. At this point we will note that a large body of psychological literature suggests that the universal function of spiritual transcendence found in religious systems serves to reduce psychic disharmony through helping bring about a sense of unity in the person. In Emmons' summary:

> The objective of religion, of all religions, is that of transformation of the person from fragmentation to integration, from separation to reconciliation. . . . Religion invests human existence with meaning by establishing goals and value systems that pertain to all aspects of a person's life . . . [29]

The capacity of religious systems to unify was also a concluding theme of Gorden Allport's classic study, *The Individual and his Religion.* The religious sentiment, he said

> is the portion of personality that arises at the core of the life and is directed toward the infinite. It . . . is capable of conferring marked integration upon personality . . [30]

Major theological interpretations of this function of spirituality support the findings of these psychologists. Noted theologian Paul Tillich, for example, describes faith as essentially an "act of centering" in that it centers, or unifies, one's personality toward some meaningful whole. To be oriented toward an ultimate concern, Tillich writes, "gives depth, direction, and unity."[31]

Not surprisingly, this core function of religious systems has been a foundational theme of the wilderness movement since its beginnings. This orientation toward or sense of embeddedness within an ultimate reality was the basis of Henry Thoreau's belief that one should "regard [oneself] as an inhabitant, or part and parcel of nature." It was the basis of John Muir's characterization of man as "a small part of the one great union of creation," why one should "feel part of wild nature, kin to everything . . ." It underlies Aldo Leopold's pronouncement that we are "only fellow voyagers with other creatures in the odyssey of evolution." It is the basis of his

striving to "change the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it."[32]

Clinical and Health Psychology

In recent years, growing recognition of the mental and physical health aspects of a spiritual orientation has resulted in a considerable body of research which 1) lends support for considering the preceding summary of spiritual experience as a valid scientific construct (e.g. can be reliably and objectively assessed), and 2) provides evidence that a spiritual orientation can measurably contribute to personal well-being.[33] Thus these fields support efforts to maintain or provide wilderness conditions conducive to spiritual experience. This research is largely based on correlational studies that document relationships between personal attributes or orientations defined as spiritual and positive aspects of physical and psychological well-being. These fields offer functional definitions of spirituality and provide psychometric scales to measure it.

Many studies have shown the positive relationship between a religious or spiritual orientation and physical health. Statistically, people of faith enjoy longer life, have lower blood pressure, less heart disease, and better immune system functioning than the population at large. [34] Emmons' research and exhaustive review of the psychological literature also documents mental health benefits, both in terms of positive well being (happiness and life satisfaction) and lesser rates of negative states (depression and anxiety). He finds that "The 'faith factor' emerges as a significant contributor to quality-of-life indicators such as life satisfaction, happiness, self-esteem, hope and optimism, and meaning in life."[35] These findings result from both self-report and more objective measures. Emmons concludes that "When people orient their lives around the attainment of spiritual ends, they tend to experience their lives as worthwhile, unified, and meaningful." [36]

In considering these results, however, we must recognize that most studies focus on church members. Therefore the generalizability of the findings to the spiritual aspects of their religion is somewhat limited. Some of these mental and physical health benefits may be the result of the religion's prohibition of unhealthy behaviors or the supportive social network it provides.

However, recent psychometric research that does not select subjects based on any affiliation suggests that these benefits may be more correlated with universal aspects of the spiritual orientation than with factors related to behavioral sanctions or doctrine.

One example is Ralph Piedmont's study, *Spiritual Transcendence and the Scientific Study of Spirituality.* Consistent with the preceding religion-based interpretations, Piedmont finds spirituality to be the individual's effort to construe a broad sense of personal meaning, to construct some sense of purpose for their life. As with religious perspectives, he finds it to be based on the experience or state of transcendence:

> The capacity of individuals to stand outside of their immediate sense of time and place and to view life from a larger, more objective perspective. This transcendent perspective is one in which a person sees a fundamental unity . . . [37]

Piedmont developed a "Spiritual Transcendence Scale" that identified two major components of this experience or state that also recur throughout the popular and research literature concerning the spiritual perception and experience of wilderness and nature. One is "universality," defined as "a belief in the unity and purpose of life," and "one's sense of belonging to a larger organic whole." Piedmont found Universality to be related to self and independent ratings of psychological well-being and perceived physical health. The other component is "connectedness," a belief that "one is part of a larger human reality that cuts across generations and across groups." It was positively related to prosocial behavior.

Piedmont describes a practical function of spiritual personality traits that helps explain why, through biological and social evolution, a predisposition for a spiritual orientation developed and persists. In helping provide answers to life's most existential questions (e.g. purpose and meaning) he says, spirituality provides our lives "a more meaningful coherence that gives us the will to live productively."[38]

Indeed, major personality theorists since the time of Freud and Jung have recognized that 1) coherence or integration of one's purposes, goals, and behavior contribute to psychological health, and 2) disharmony and conflict among them contributes to psychic stress. [39]

Emmon's "coherence hypothesis" draws upon a large body of research to suggest that spirituality is a psychological mechanism by which one's goals and sense of purpose are integrated. It is a means through which one develops a coherent sense of who they are in the larger scheme of things. In doing so, a spiritual orientation reduces the sense of fragmentation and conflict between goals – reducing psychic stress. A more integrated self provides a foundational sense of meaning and purpose that serves not only in dealing with life's existential questions, but also with everyday decisions among conflicting alternatives.

Thus Emmons concludes that

> . . . intrapsychic conflict consistently predicts poor physical and psychological health. . . . Optimal health and well-being occur when different elements of personality are integrated into a more-or-less coherent whole. Personality integration . . . has long been viewed as an important precondition for optimal psychological health[40].

The evolutionary origin and neurophysical mechanisms of this sense of integration will be considered in a later section. At this point we will note that the fields of clinical and health psychology provide empirical support for what the founders of the wilderness movement knew intuitively – that the kind of spiritual orientation many find in Wilderness – Thoreau's "tonic" of

Wildness – can be good for us. Findings we will now consider from the fields of leisure and wilderness recreation research further enhance our understanding of these benefits.

Leisure and Wilderness Recreation Experience

Within these fields a number of studies reveal the applicability of these religious and psychological aspects of spirituality to the system of Wilderness thought and belief.

The first major study to describe the contemporary perception and experience of Wilderness in terms of a spiritual/religious experience was Linda Gaber's 1976 study, *Wilderness as Scared Space*. Examining the founding principles of the Wilderness movement, the arguments of more recent Wilderness proponents, and the on-site experience of those she describes as wilderness purists, Graber declared the first corollary of the wilderness ethic to be transcendence:

> One goes to the wilderness in an attempt to transcend his ordinary world, self, and manner of perception; in other words, to have a religious experience. . . . . Wilderness helps man to achieve transcendence.[41]

While Graber's ground-breaking work serves to highlight the historic and contemporary aspects of the spiritual dimension of Wilderness, it probably overstates the role of the spiritual element of the wilderness experience. Clearly, many enthusiasts go to Wilderness without such expectations. Many have meaningful experiences, and experience important psychological benefits that are not spiritual in the sense she and psychological researchers have described it. We need to keep in mind that spirituality is a significant, but not singular underpinning of the system of thought and belief embodied in the concept of Wilderness.

The *Primal Hypothesis* recently developed by David White and John Hendee tested a foundational assumption of the wilderness ethic that the qualities of naturalness and solitude contribute to the spiritual experience of Wilderness. Based on their empirical study of three groups of wilderness visitors and a review of other studies, they found that spiritual benefits are positively correlated with the wilderness conditions of naturalness and solitude.

Their research serves to differentiate between those psychological aspects and benefits of Wilderness that are spiritual and those that are not, or are only peripherally related. Consistent with our previously considered definition, they define "Spiritual Development" benefits of Wilderness as deriving from

> a deep sense of connection to all things, such as the larger universe, a higher power, nature, a feeling of oneness – what is referred to as "connection to Other," as opposed to "connection to self . . ."[42]

In contrast, their "Development of Self" category includes psychological benefits variously described as personal growth, restored functioning, stress relief, and a plethora of "self"

constructs, including enhanced "self image," "self identity," "self efficacy," and "self esteem." Barbara McDonald and others also recognize a distinction between wilderness experience as a "personal discovery" and as a "discovery of relationships." They argue that "spiritual growth is something well beyond healthy personal growth," and define it as "the sudden or gradual awareness of self-other relationships."[43]

Insight into the correlation between "self benefits" and the "self-other relationships" variously associated with wilderness experience is emerging from research related to a growing number of Wilderness Experience Programs (WEPs). Run by commercial and non-profit organizations, these programs bring participants to wilderness for purposes emphasizing personal growth, therapy, and education.

Among them is Wilderness Transitions, a vision quest program run by researchers Marilyn Riley and John Hendee. Their study, covering a ten-year period, examined the benefits reported by participants of an eight-day trip. A coding of key words and phrases that respondents used to describe aspects of their experience led to two categories of benefits, those being related to "self" and those related to an "other."

The first category included responses related to intra-personal growth or expansion: self-connection, self-awareness, self-reliance, self-empowerment, self-discovery, self-identity, self-insight, and self-acceptance. The second category reflected an outward focus – connectedness to entities such as nature, the universe, or all things.

Their data suggests a progressive relationship between the two categories. Attaining certain "self benefits" may be a prerequisite or preparatory condition – part of a process toward spiritual experience. In their summary, "increasing degrees of connections to oneself in nature, culminating in feelings of self-reliance, strength, and empowerment, may then lead to spirituality."

Naturalness and solitude were perceived as essential conditions for attaining the reported benefits. A more developed recreation area was thought to be less conducive to these experiences because of distractions, the threat of intrusion, and less challenge. [44]

Laura Fredrickson's comprehensive qualitative study, *Exploring Spiritual Benefits of Person Nature Interactions* supports these findings. Based on on-site interviews, survey instruments, and personal journal analysis of groups in two wilderness areas, she found that

> By far, the wild and natural appearance of each of the two recreational settings was the landscape feature that most heavily influenced individuals to contemplate spiritual matters . . . . it was precisely the pristine natural environment – areas with little or no evidence of human intercession – that spiritually inspired [the subjects] and left them open to perceiving the place in more of a transcendent totality. [45]

Fredrickson's study identified a number of characteristics of the spiritual experience in wilderness that are consistent with those identified in religious and psychological research, supporting the view that the spiritual perception and experience of Wilderness is one manifestation of a universal predisposition. These characteristics include "connection to universal power," "sense of oneness," "interconnectedness," "heightened awareness," and "transcendence."

The following representative statements from her subject's journals help illustrate how these characteristics are felt and experienced:

> *I had this sense of being truly connected to the lifeforce itself*
>
> *let me step back from my life and put it into perspective, to refocus on the things that really matter*
>
> *I felt at one. At one with . . . whatever. I suppose you could call it spirit, at one with the Universe.*

Fredrickson found that these aspects were not incidental benefits of the wilderness experience; they were identified as among the most meaningful. Further, she documented the fact that these were not just on-site benefits. They go home with the visitor. Her subjects came to view their wilderness trip within the larger context of their lives. She found that this benefit continues vicariously, not only in the form of fond memories, but also through the continuing satisfaction one finds in just knowing places of spiritual value remain. One participant acknowledges she may never return, but

> *I need to know that there are still places like this that have been left relatively untouched . . . it feeds my deepest spirit to know that places like this still exist*

Fredrickson's study makes a compelling case that 1) wilderness managers need to broaden their understanding of the full range of benefits found in Wilderness, and that 2) the traditional approach to recreation research "is grossly inadequate in capturing the full impact of the more psychologically based affective components of recreational experiences, such as those that could be considered spiritual benefits." [46]

Going beyond traditional approaches is the work of Steven and Rachel Kaplan and Janet Talbot. From the perspective of cognitive and evolutionary psychology, they have examined various beneficial aspects of wilderness recreation and discovered important spiritual elements. Their findings are based on a synthesis of the recreation literature and on their extensive 12-year Wilderness Laboratory Project. While this project was not conducted in designated Wilderness, the setting possessed three elements of their psychologically oriented definition of wilderness: 1) a dominance of the natural, 2) a relative absence of civilized resources for coping with nature,

and 3) a relative absence of demands on one's behavior that are artificially generated or human-imposed (e.g. cognitive freedom).

Consistent with other studies, they found that their study participants experienced conditions conducive to self-reflection, self-discovery, self-confidence, and "a greater clarity about what is important and what is not important."[47] But importantly, the positive changes in their subjects' self-concept occurred in a larger context. The participants felt that they were learning new ways of thinking about their place in the world. They found that their participants' immersion in wilderness "leads to thoughts about spiritual meanings and eternal processes."[48] They summarized the "spiritual dimension of human experience" that wilderness facilitated for their subjects as the feeling of

> A sense of union with something that is lasting, that is of enormous importance, and they perceive as larger then they are.[49]

This is essentially transcendent experience as previously defined. Contributing to it was a "lessening of distractions"– those activities and concerns of everyday life that get in the way of what's most important. The participants experienced feelings of "wholeness," "integration," and "oneness" with the environment that contribute to a coherent sense of self.

The Kaplans' and Talbot's evolutionary perspective attributes much of this spiritual component of wilderness experience to a deep past that continues in us. They interpreted their findings as suggestive that

> some ancient resonance is at work, that the wilderness setting calls on predispositions that became part of the human psychological makeup in the course of evolution [50]

Psychologist Robert Greenway doesn't use the term "spiritual" although the findings of his research support the notions that the transcendent experience many find in Wilderness contributes to health and is an inherited predisposition.

Based on 700 questionnaires and interviews examining what he terms the "wilderness effect," Greenway found that a primary value of the experience was the "perceptual shift" many of his subjects found. Consistent with the notion of self-transcendence, this shift involves a lessening of the ego. He found that culturally reinforced individualistic thinking patterns become less dominant, opening minds to new ways of perceiving. His work suggests that many visitors who cross the physical boundary of Wilderness do not cross this "psychological wilderness boundary" to find benefits defined as spiritual. Those participants who do

> most often speak of feelings of expansion or reconnection. We might interpret these as expansion of "self," or a reconnection with adaptions of our evolutionary past, still layered in our deeper psyches, or simply with complete and fully natural

systems. [51]

Greenway's term "perceptual shift" is worthy of attention because it perhaps most accurately describes the nature of most spiritual "experiences" in Wilderness. The onset, intensity, and duration of transcendent experiences varies widely. The sudden, brief, intense, and often ecstatic experiences such as John Muir described comprise an extremely small proportion of popular or research-based accounts of transcendent experience in Wilderness. The Wilderness equivalent of religious conversion experience seems rare. In fact the use of the word *experience* may be somewhat misleading if taken to mean a discrete, identifiable event or episode. A distinction drawn by Barbra McDonald and others is useful. They describe the "spiritual experience" as a rather sudden occurrence. Their term "spiritual growth" describes the more gradual change in awareness more characteristic of the phenomena.[52]

Perhaps the area of leisure and recreation research that best integrates the formentioned findings from religion and mental health research into the wilderness experience is psychologist Mihaly Csikszentmihalyi's widely recognized conceptualization of the "flow" state.[53]

Flow is experienced when one becomes so absorbed in an activity that distinctions between ones' intentions, actions, and the setting are gradually lessened. One's "self" merges with the activity and the environment to the point where it is nearly erased from conscious awareness. Flow was so named because subjects reported that immersion in the experience was analogous to being on a river, being "carried on by the flow." In Csikszentmihalyi's words, "We no longer look at what we are doing from the outside, we become what we do. The climber feels part of the rock, the sky, and the wind . . ."[54] Margaret Murie was experiencing flow when she described the Arctic Refuge as "a world that compelled all our interest and put everything else out of mind." [55]

Central to the flow experience is loss of self-consciousness. Immersed in the activity and setting, one is able to forget, or hold in abeyance, awareness of status concerns, and pressure to conform to socially defined roles and norms. One's perception of the world is less affected by the filter of their self-image. In contrast to everyday experience, the flow experience is less felt, known, and evaluated for its bearing on the self. Unconcerned with how he or she is perceived by others, the individual is more free to be – or discover – who they really are, what is most important to them.

Flow experience seems to be a state that cannot be consciously sought. It arises indirectly, a byproduct of some whole involvement. It is emergent. Howard Zahniser may have been thinking of flow experience when he noted that people go to Wilderness to escape from their normal self, but the greater benefit is attained when they lose their self there. He noted that Jesus suggested that self-seeking is not the way to self-realization. Summarizing Jesus' lesson, he said, "not deliberately, but through indirection human beings realize their best welfare, by losing sight of themselves." [56]

Not surprisingly, the diminishment of self and ego concerns central to attainment of flow is central to Asian religious philosophies that were influential in the development of the wilderness

ideology. As Csikszentmihali points out, practitioners of Yoga, Taoism, and Zen Buddhism all seek to find a unitive experience through freeing consciousness from ego concerns. For those not trained in these disciplines of spiritual attainment, Wilderness may be particularly conducive to this state because of the physical and temporal separation it provides from the reminders of our individualistic society.

As an experience where one "becomes part of a system of action greater than what the individual had been before," flow is essentially the spiritual experience of transcendence. Csikszentmihalyi's research supports extending the spiritual health benefits previously examined to the wilderness experience. These benefits derive from the same source: a sense of integration and wholeness one experiences when one's orientation shifts to an ultimate reality beyond and larger than the self.

With one's self-image/self-concern minimized, goals, feelings, and actions are more unified. There is less conflict between what one is, and what one should be. There is less personal incongruity to reconcile. Since at least the time of the Greek philosophers, this internal conflict has been theorized to be the chief source of psychic stress. The congruence between one's goals, feelings, thoughts, and actions produces a rare sense of harmony. For a brief time the flow state enables one to feel whole.

This diminishment of competing claims on one's attention and conflicting desires represents a re-experience of some aspects of our Paleolithic past, a simpler time when we were embedded in the natural world. Certainly, more than 99 percent of our evolutionary history occurred when there were fewer prescribed social roles, fewer alternative goals and conflicting courses of action. If recent history is any guide, our culture will become increasingly complex and alienated from the conditions that formed and shaped us as a species. Lives will become increasingly segmented by the calendar and fragmented by the clock. Specialization will continue. "Overchoice" may become a pivotal psychological reality of the future. If so, then perhaps as Csikszentmihalyi suggests, the opportunity to find, however briefly, the harmony of flow experience will become increasingly important to future generations of our rapidly changing world.

But what descriptive and explanatory framework can best serve those concerned with understanding, accommodating, and perhaps enhancing the benefits associated with this transcendent state of flow? How can it be conceptualized within the scientific paradigm in which natural resource managers operate?

Csikszentmihalyi suggests that the findings of the various disciplines concerned with the ultimate questions spirituality addresses be integrated within one unifying concept – a concept that explains our origin and relates us to the natural world: the process of evolution. Consider the concluding thoughts of his book, *Flow.*

> Everything that matters most to us–such questions as: Where did we come from? Where are we going? What powers shape our lives? What is good and bad? How

> are we related to one another, and to the rest of the universe? What are the consequences of our actions?– could be discussed in a systematic way in terms of what we now know about evolution . . .

Csikszentmihalyi persuasively argues that we can best direct our efforts

> when we understand better why we are as we are, when we appreciate more fully the origins of instinctual drives, social controls, cultural expressions–all the elements that contribute to the formation of consciousness . . .[57]

These are the elements that, since the time of the Transcendentalists and Romantic Naturalists, have contributed to the development of the wilderness ethic as well.

We will now consider areas of research that provide scientific understanding of the evolutionary origin and purpose of the biological structures and processes that underlie the human predisposition for spiritual experience.

Evolutionary Psychology and Neurophysiology

In *The Need for Wilderness Areas*, the Wilderness Act's chief author and lobbyist Howard Zahniser described Wilderness as "a piece of the long ago that we still have with us."[58]

Biologist Olaus Murie described "an attitude inherent in us," . . . "a deep seated impulse." He referenced "attributes which we have inherited and developed through the ages . . . in response to an inner urge that we still have and still do not fully understand." Referring again to an evolutionary heritage, Murie said that "Perhaps we should give thought to our ancestors and feel humbly grateful for the beginnings of thoughtful regard for our land."[59] Another giant of the wilderness literature, biologist Sigurd Olson, was speaking of the evolutionary origin of the spiritual dimension when he said "There seems to be an almost universal urge, no matter what the stage of man's sophistication or removal from nature, to align himself somehow with those forces and influences that were dominant for the ages." [60]

These statements echo a theme that reoccurs throughout the wilderness literature, from Thoreau to the present: there exists within us some primal predisposition for transcendence. That is, there exists some innate longing to be connected to the larger world that formed and shaped us as a species, to sense relatedness with the natural processes in which we are embedded.

This wilderness precept is based on the assumption that this impulse or urge is not merely learned, but actually inheres within us as a species. While wilderness managers and policy makers don't deny such a presence, the fact that a physical basis for it has resisted observation and measurement has discouraged all but the most indirect recognition. Lacking empirical means to describe or explain what seems to be one manifestation of a psychological universality, it has been relegated to a realm that, if not paranormal or supernatural, is at least distinct from the

normal process of nature.

But a convergence of research from the fields of evolutionary psychology and neurophysiology lends support to notions of primal underpinnings of the spiritual dimension of Wilderness. They suggest that human spirituality is not supernatural. Rather it is an entirely natural component of our humanity. It is grounded in biological structures and processes that are encoded in a genome that developed in synergistic evolution with the natural world. Significant evidence for this is found in the Wilderness within – within the innermost and evolutionarily most ancient part of the human brain.

A recent and comprehensive exploration of the physical basis of spirituality is found in the neurophysiological studies of Andrew Newberg and Eugene D' Aquili. Their research, corroborated by other findings, provides strong evidence that biology compels the spiritual urge. In their summary:

> . . . we saw evidence of a neurological process that has evolved to allow us humans to transcend material existence and acknowledge and connect with a deeper, more spiritual part of ourselves perceived of as an absolute, universal reality that connects us to all that is . . .[61]

Their findings are based on brain imaging studies of subjects in the midst of spiritual experience, described as "the absorption of the self into something larger."[62] Their subjects were Buddhist meditators and Franciscan nuns whose training and experience enabled them to enter a spiritual state in the laboratory. A high-tech SPECT camera[63] was used to map activity patterns in various areas of the brain during spiritual experience.

The scans were taken during meditation or while subjects were engaged in deep prayer. They showed that as the subjects passed through stages of quiescence and came to "free the mind's awareness from the limiting grip of the ego," [64] neural activity in an area of the brain's left parietal lobe was dramatically reduced. This area is called the Orientation Association Area. It is a specialized bundle of neurons that functions to distinguish between the self and the non-self, between the internal and the external environment. It interprets incoming information from the perspective of its bearing on the self.

Newberg and D'Aquili found that during transcendent experience the Orientation Association Area becomes "deafferented." That is, blood flow is reduced, and this area receives less neural input. As a result, perceptions of the external world reach one's awareness through neural pathways less affected by the filter of the ego. One's individual identity is less distinct. The boundary between the self and the larger world becomes blurred and less central to perception. Perhaps neural pathways that evolved before the development of conscious thought are triggered – pathways linked to emotional processing rather than the more recently evolved cognitive processing. Perhaps this way of processing is an artifact of our first nine months when neural pathways were being formed, a prenatal memory of that formative period when we were

completely united with and embodied within what was otherwise external to us. Regardless, the lessening of the self, subordination of the ego, and interpretation of one's surroundings more in the context of connection and relationship is correlated with observable processes in the Orientation Association Area.

Recent findings in human genetics support the physiological basis of spiritual experience. A number of correlational twin studies in the 1990s have shown that there is a significant genetic component to religious values and attitudes. [65] Advances in gene mapping are revealing more direct evidence. In 2001, a study by David Comings and others reported a revolutionary finding: "a significant correlation between a specific gene [DRD4] and self-transcendence and spirituality." [66]

If the accelerating trends in neurophysiological and genetic research continue, it seems inevitable that the tendency for spiritual experience will be accepted as a universal, inherited predisposition, an innate part of our wiring as *Homo sapiens*. If so, perhaps the conclusion of the Forest Service's visionary Environmental Psychologist Herbert Schroeder will become a widely accepted precept of wilderness management: "Spiritual phenomena are just as much a part of the real world as are ecological processes . . ."[67]

The sense of union with an ultimacy that seems to have archetypal origins is theorized to be the basis of spiritual experience in all its forms. For our hunting-gathering ancestors, it was likely totemism that embedded the individual within the natural world by emphasizing descent from and kinship with animals. For deists, it may be conceptualized as a relationship to a personalized god who created and oversees the world. For Buddhists, it may be union with the ultimate oneness of everything. For wilderness enthusiasts, it is often a sense of connection to the natural world, the community of life, or evolutionary process. Regardless of one's interpretation, the neurological structures and processes that enable the experience of subordinating the ego to an ultimate reality beyond the self are likely the same. Since the human genome has changed little since Paleolithic times, it seems likely that our predisposition for spiritual experience is much the same as that of our wilderness dwelling ancestors.

This proposition begs two questions: Where did this predisposition come from, and why does it persist?

Of course, whether or how divine forces might have guided this development would not have shown up on brain scans or genome maps. But consistent with our original premise, we will assume the answer to these questions is not "out there" but rather within us. We assume that like other biological structures and processes, the components of transcendent experience evolved. Consistent with the basic tenet of evolution, they must have evolved for a purpose. They evolved because they somehow enhanced the fitness of our ancestors and the likelihood of passing their genes on to the future.

How? We can only speculate. But as we have noted, major theoretical positions in the areas of

the origin and psychological function of religious/spiritual systems suggest that this predisposition is an adaptive mechanism. It developed to relieve psychic stress and promote personality integration in the face of life's existential dilemmas.

The recent empirical findings related to the function and biology of spiritual experiences that we have considered interpret the predisposition toward spiritual experience as a response to these existential questions. For example, Ralph Piedmont attributes the spiritual tendencies he documents to humans becoming "intimately aware of our own mortality:" He writes:

> As such, we strive to construct some sense of purpose and meaning for the lives we are leading. We question our purpose for existence and the value our lives provide to the world we inhabit. Answers to these existential questions help us to weave the many diverse threads of our lives into a more meaningful coherence that gives us the will to live productively.[68]

Before the evolution of human consciousness there were no questions about the meaning and purpose of life, no inner conflicts of the will. Our distant ancestors lived seamlessly within the natural world. They lived within a unified cosmos. Guided solely by the structures of the limbic system (the reptilian brain) they were, like other animals, biological responders to their environment.

However, with the evolution of cortical structures that enabled self-awareness came what Newberg and D'Aquili describe as "the sobering understanding that everyone dies."

> By comprehending their own mortality . . . their questioning minds must have presented them with difficult and unanswerable questions at every turn: Why were we born only eventually to die? What happens to us when we die? What is our place in the universe?[69]

These researchers theorize that the capacity to enter transcendent states, to sense unity with the larger world, served to reduce the stress inherent in these existential realizations. The development of such an orientation enabled our ancestors to sense their brief lives as part of a larger, more enduring reality. They attained some sense of symbolic immortality, becoming part of something that both extends and outlives their individual selves. The earliest forms of this sensation/realization are hinted at in the evidence left by ancient burial practices and prehistoric cave art. Analysis of early preliterate myths and the widespread totemistic practices of tribal people lend further support.

Through time, bio-cultural evolution led to an infinite variety of increasingly sophisticated manifestations of the spiritual impulse. In some systems, belief in spirits or personalized beings evolved to serve as a connection to the larger whole. In other incarnations, such as the major Eastern belief systems, people found assurance in union with an ultimate oneness. But common to all manifestations is a pragmatic benefit: The sense of connection to an ultimate reality,

however conceived, helped alleviate psychic stress by reducing the effects of fatalistic realizations. There is no reason to believe that the documented positive effects of a spiritual orientation on personal well-being are a recent development. They probably improved the psychological outlook of the individual and group since the development of human consciousness, providing an evolutionary advantage in the struggle for survival.

Humanistic Psychology

If in fact a spiritual orientation is a human predisposition, two questions arise. What explains the individual variation in spiritual response? Why do many who encounter or chose to visit Wilderness not have an orientation to or experience mental states described as transcendent or spiritual? We have noted that biological structures and processes resulting from one's unique genetic inheritance play some role in influencing their spiritual orientation. In the near future, research in the fields of genetics and neurophysiology will most likely enlighten, if not revolutionize our understanding of the biological aspect of one's individual predisposition to spirituality. But certainly, a great deal of one's spiritual orientation toward Wilderness, like one's spiritual orientation in general, is more than a response to primal needs.

At some point in the distant past, our minds began to evolve in response to consciousness of ourselves, both as individuals and as members of social groups. Development of that awareness provided survival advantages, but also resulted in a new realm of motivations and needs.

Abraham Maslow's model of human motivation emphasizes such evolving needs. It provides an explanatory framework for understanding some of the individual variation in spiritual response to Wilderness. His humanistic or "Third Force Psychology" is based on the belief that we have evolved a tendency to expand our individual potential. Maslow theorized a "hierarchy of human needs," a sequence of needs which must be fulfilled in order for a high level of functioning, "self-actualization," to occur. The prerequisite needs include, first, physiological needs (food, water, shelter), then safety needs, then the need for affiliation and belonging, then self-esteem needs. These hierarchical needs are not strictly sequential, but rather more gradually phasic. It makes intuitive sense that one will not be much concerned with his or her self-image until they feel secure and safe. Likewise, one is not likely to extend one's identity to the larger world until they feel comfortable with themselves and secure with their role in the social world.

The self-actualization realm of functioning is described as a positive state of mental health characterized by creativity, originality, self-acceptance, inner-direction and relative independence from social pressure for conformity. These characteristics may describe a stage through which one must pass in attaining a spiritual orientation. One characteristic of self-actualization is specifically spiritual in nature. In Maslow's words:

> Self-actualizing people are, without one single exception, involved in a cause outside their own skin, in something outside of themselves . . . all in one way or another devote their lives to the search for what I have called the "being" values,

> the ultimate values that are intrinsic, which cannot be reduced to anything more ultimate . . . [70]

Self-actualization is often associated with wilderness experience in the popular literature. In the research literature, Won Sop Shin found significant positive correlations between wilderness camper's attitudes and their levels of self-actualization.[71] Robert Young and Rick Crandall found a positive, though weak, relationship between wilderness use and wilderness attitudes and self-actualization. [72]

Maslow later extended his popular concept of self-actualization, believing that it put too much emphasis on the self. He theorized a culminating "Fourth Force Psychology," a more transcendent orientation he characterized as

> transpersonal, transhuman, centered in the cosmos rather than in human needs and interest, going beyond humanness, identity, self-actualization, and the like.[73]

In extending the boundaries of the self, this highest level of personal orientation opens one to a sense of being within a larger reality. It is essentially the spiritual orientation described by both religious and psychological literature. Maslowian theory suggests that many people do not interpret or experience Wilderness in a self-actualizing or transcendent mode because they have not satisfied their prerequisite lower level needs.

The applicability of Maslow's hierarchy of needs to wilderness experience finds support in numerous socio-demographic studies of wilderness visitors. Consistently, it has been found that wilderness users have higher income, are better educated, and are more likely to hold professional positions than the general population. Having their basic and mid-level needs met, they are more predisposed to attain the spiritual benefits of the wilderness experience. But certainly the psychological benefits of Wilderness are not limited to those who may be best prepared for spiritual experience. Wilderness experience can help one meet these lower-level prerequisite needs. For example, a plethora of studies provide evidence that wilderness experience contributes to needs related to escape from undesirable life or work conditions, stress relief, social recognition, and the creation and affirmation of personal identity. [74]

In summary, one's degree of spiritual orientation or intensity of spiritual experience is probably, in some part, a function of the position they have attained on the hierarchy of human needs. This "position" is not fixed, of course, but changes or progresses in the course of one's personal development. Thus, in helping meet lower-level needs, wilderness experience may contribute to development of a spiritual orientation.

Throughout this paper the spiritual interpretation and experience of Wilderness has been referred to as a predisposition. But the biological and personal/social needs that comprise this predisposition are but two types of factors that influence one's orientation toward and benefits derived from the spiritual dimension of Wilderness. Interacting with them is a learned

representation of Wilderness as a place with a spiritual dimension. We will next consider the nature and role of this representation.

The Representation of Wilderness as a Place of Spiritual Value and Experience

> *The values which exist in wilderness are very delicate. They depend not only on what one can see and hear, but also on what is in the back of one's mind.*
> Robert Marshall, 1935 [75]

Robert Marshall was the first wilderness advocate to make significant use of the emerging science of psychology to understand the human meaning of Wilderness. He recognized that one's experience of Wilderness is not just a determined, innate response to environmental stimuli. His reference to "what is in the back of one's mind" describes a socially constructed representation of Wilderness, a network of beliefs, ideas, emotions, images, and imaginings one brings to the setting that overlay his or her inherited predispositions.

As he peered from a Brooks Range peak into a religiously metaphoric "Eden of men's dreams,"[76] Marshall was reacting to more than features of the objective environment. His experience was also a response to this representation of Wilderness, learned by him through social networks and exposure to various media, particularly literature and art.[77] These media influenced him through direct experience and indirectly, through having grown up in American culture. This representation constitutes the wilderness landscape as opposed to the wilderness environment. Landscapes are objective environments that have been endowed with subjective meaning. As described by sociologists Thomas Greider and Lorraine Garkovich:

> Landscapes are the symbolic environments created by human acts of conferring meaning to nature and the environment, of giving the environment definition and form from a particular angle of vision and through a special filter of values and beliefs. Every landscape is a symbolic environment . . .[78]

As a symbolic representation, Wilderness, like a church or cathedral to which it is so often compared, has become invested with meanings that make it prone to support spiritual interpretation and experience. This is the consecration or designation effect which enlarges a landscape's capacity to carry meaning. The degree to which socially constructed meanings may have risen from archetypal predispositions and the way they interact with them is far beyond our current understanding. But from the perspective of cognitive psychology, schematic perception theory provides a model for understanding how acquired meanings function in one's spiritual response to Wilderness. A schema is a network of neural connections defined as

> a memory structure that develops from an individual's experiences and guides the individual's response to the environment . . . the schema influences the individual not sequentially, through its component pieces, but simultaneously as a total

mass.[79]

The individual experiences referred to are schema components that include one's objective knowledge, beliefs, impressions, and associations related to a schema subject such as Wilderness. They are derived from numerous sources beyond personal on-site experiences, including the popular literature, art, photography, other media, and social networks one has been exposed to or has availed him or herself to. The various learned elements are hypothesized to subconsciously coalesce to serve as a unified belief structure. Thus the wilderness enthusiast arrives with a "wilderness schema" that acts as a perceptual filter, influencing what he or she notices in the environment and how they perceive and interpret it.

When a person with a wilderness schema encounters – directly or vicariously – certain wilderness features, conditions, or situations, a complex, undifferentiated network of learned meanings is triggered and activated to form emotional, cognitive, and behavioral responses. This process occurs quickly, without conscious thought or appraisal. The neurophysiological happenings between sensation of a stimuli that has been socially and personally invested with meaning and the response are little known and beyond the scope of this inquiry. Our purpose here is to explore the spiritual component of the social construct popularly termed "the wilderness ethic" that one unconsciously draws upon to interpret the meaning of wilderness.

We will examine the foundational beliefs and ideas of this construct or representation by examining spiritual aspects of the two media most influential in both establishing and describing the wilderness ethic: literature and art. As geographer Yi-Fu Tuan's research shows, such media simultaneously serve two functions. They are a "diagnostic index"or evidence of a set of beliefs, ideas, and meanings held by a culture or subculture. At the same time they function as "a creative force, directing culture, enabling people to see their world in new ways."[80] As these media expand and extend one's sense of the meanings a place holds, they shape, consciously and subconsciously, the kind of experience one expects to find. As research in expectancy theory has shown, one's expectations exert a powerful influence on one's experience. Many wilderness writings take the form of a travel narrative, providing readers with expectations of similar adventure and discovery, inward as well as outward. Simply put, the belief that a place – whether a church, memorial, or a Wilderness – is a place of spiritual experience helps to catalyze that experience.

The media also influence norms more specific to the emotional domain. Emotional, or automatic felt response, has always been associated with spiritual experience of Wilderness in the popular literature. Writings provide both explicit and implicit descriptions of how one should feel in the wilderness setting or in the presence of certain wilderness features. Art conveys a mood or ambiance associated with spiritually related themes. Prominent writers and artists are highly influential in providing social "definitions" of appropriate emotion. A. R. Hochschild's theory of "feeling rules" suggests that feelings of reverence or humility such as those evoked by Wilderness are, at least in part, a function of a socially prescribed response.[81] They are an undifferentiated part of the wilderness schema one unconsciously draws upon in forming his or

her emotional as well as cognitive and behavioral response to Wilderness.

We shall now explore how the spiritual dimension has been represented in some of the wilderness literature and art that has been most influential in shaping the wilderness landscape from the Colonial Period to the enactment of the Wilderness Act in 1964. As previously discussed, the concept of spirituality in popular use has been applied to a diverse range of human experiences that have some perceived positive effect ranging from general enjoyment to deep insight. We shall narrow consideration of spiritual aspects or themes of the wilderness media to those that fit within this previously offered psychologically-based definition of the spiritual dimension:

> The capacity of a landscape to support or evoke the experience of or orientation toward an ultimate value larger than the self that enhances the meaning and purpose of one's life. This capacity results from the interaction of a set of meanings the individual has learned and ascribes to the setting, and an innate human predisposition to seek connection or relatedness to an ultimate reality.

Wilderness Literature

The Bible

The first significant literary influence on American's conceptualization of Wilderness was the Bible, the colonist's life guidebook. Roderick Nash notes 280 occurrences of the word *wilderness* in the King James version, most with negative connotations.[82] The dominant biblical perspective of Wilderness during the colonial period is reflected by two reoccurring themes of Puritan writing. Wilderness was both a threatening, physically dangerous place, and it was a spiritually dangerous place. Remote from the controlling influence of the church and society, man's inherently evil nature would be unrestrained in Wilderness. In the moral vacuum of Wilderness, a soul could get lost spiritually as well as physically.

But as their environment became tamed, and their basic sustenance and security needs met, Americans began to look to Wilderness to meet esthetic, cultural, recreational, and other higher-level needs. By the late 1700s, growing numbers of Americans (particularly those in the higher economic and educational strata) were receptive to the emerging European concepts of Romanticism and Primitivism, which portrayed wild nature as a positive influence.

By the time the various ideas about human nature and nature coalesced into the Transcendental movement of the early to mid-nineteenth century, Wilderness was in retreat. The belief that it was a spiritually dangerous place no longer served a significant adaptive function in American society.

But Biblical references to the social and psychological influence of Wilderness were not entirely negative. In both Old and New Testament accounts, Wilderness served some positive purposes

that became prominent themes in the early wilderness literature and emerged as underpinnings of today's wilderness ethic.

Nash describes how the Old Testament account of the Israelite Exodus from Egypt served to establish the perception of Wilderness as a place where one might find freedom from a dominating society. Beyond refuge from oppression, the desert Wilderness provided what psychologists refer to as "cognitive freedom," that is, freedom from dominating social influences and pressure to conform to established values, norms, and roles. This freedom is central to the expanded thinking required for spiritual insight.

In her study of the wilderness literature, "Wilderness As Sacred Space," Linda Graber concludes that the first corollary of the contemporary wilderness ethic is that "One goes to wilderness in an attempt to transcend his ordinary world, self and manner of perception; in other words, to have a religious experience."[83]

Indeed, in Western society the Exodus is probably the first widely read account of this potential function of Wilderness. The remote Wilderness of the Sinai Peninsula provided isolation from the influence of a society perceived as sinful. Then, as now, such isolation was conducive to introspection and self-reflection, a prerequisite for transcendence. Then, as now, this wilderness effect requires something of one, some sacrifice. The Israelites had to "rough it" during their forty-year sojourn. They endured hardships and faced challenges. They were tested and humbled by the experience and emerged stronger, and thus made ready to receive the commandments for righteous living in the Wilderness of Mount Sinai. The Exodus established a purpose of Wilderness that resonates through the contemporary wilderness literature: Wilderness can be a place of escape, of transformation, of new beginnings.

The prophet Elijah's retreat to the Wilderness for a symbolic forty days to find and draw close to God reinforces the theme that wilderness can provide a spiritual oasis, a place of escape and a return. It can provide an escape from detrimental influences of society and its pressure for conformity to controlling or stifling norms. Elijah's sojourn is also the story of a return to that ultimacy (God) outside the self that provides higher meaning and purpose to life.

This theme continues in the New Testament where John the Baptist went to the remote Jordan River valley to prepare for the coming of the Messiah. Significantly, it was in the Wilderness, not in a temple, that he baptized Jesus. Afterward, Jesus "was led up by the Spirit into the wilderness . . ." After forty days of testing, he found enlightenment. "Jesus emerged from the wilderness prepared to speak for God."[84] Throughout the following millennia, Christian monks and hermits (as well as those of other traditions) have retreated to the wilderness in search of insight and enlightenment, reinforcing the idea that wilderness solitude is conducive to spiritual experience.

But we must note that the substantial contribution of Biblical literature to today's representation of wilderness did not include any expression of Wilderness as a sacred place. Part of the reason may be that biblical accounts came from a non-dualistic culture that little recognized a

sacred/secular distinction. Regardless, for early American Bible readers, neither Wilderness nor nature were represented as having value in themselves. They were valuable because they provided remoteness and isolation. They provided the physical and psychological separation from repressive influences and prevailing norms that is conducive to emergence of new insights.

While the Bible's many negative references to Wilderness are essentially absent from the popular wilderness literature, its association of transcendent experience with solitude has become central to today's wilderness ethic. Biblical accounts about this function of solitude heightened Americans' receptivity to the social movement most influential in establishing the American representation of Wilderness as a place of spiritual experience: Transcendentalism.

Transcendentalism and Henry David Thoreau

Before considering the historic contribution and continuing influence of Transcendentalism on the representation of Wilderness, we will simply note that it was heir to a series of movements that expanded human's conceptualization of their place in society, nature, and the larger scheme of things. Among these social revolutions were the Renaissance, the Reformation, the Enlightenment, Romanticism, and the scientific and industrial revolutions. Transcendentalism also borrowed from the East, especially the religious/philosophical traditions of Buddhism, Hinduism, and Taoism. Particularly significant for the development of a spiritual conceptualization of nature was the decline of church authority in the eighteenth and nineteenth centuries, and the rising sense of individualism that followed.

In Transcendentalism a number of evolving ideas about humans and their relation to society, the natural world, and an ultimate reality converged to form the ideological underpinnings of the contemporary representation of Wilderness. But more than an eclectic borrowing from new and old ideologies, Transcendentalism was a reform movement. It was a reaction against stifling influences of the Calvinist Church and negative effects of urbanization and the industrial revolution. It was a reaction against Cartesian dualism, the separation of humans and nature. The reactionary aspect of Transcendentalism is readily apparent in today's wilderness ethic. Wilderness preservation is widely described as a rejection of today's "Dominant Social Paradigm." [85]

A Transcendentalist idea that was particularly significant in the evolution of the contemporary representation of Wilderness and its spiritual dimension was the notion that there exists an organic connection between humans and the natural world. This connection was most apprehensible in settings that are most free of civilization's dominating influence.

In one of the earliest and most influential Transcendentalist essays, *Nature*, Ralph Waldo Emerson stated that "nature is the symbol of the spirit . . . the world is emblematic." This perspective emerged from an earlier view that biblical events, properly interpreted, prophesied future happenings and that natural objects and places, properly interpreted, were signs and symbols of a higher reality. This higher reality was variously described as "the cosmos," "the

universe," and "the macrocosm." It held "a law implicit in the scheme of things, a controlling providence, an natural or moral law that unfolded in the very order that the cosmos represented."[86]

Henry David Thoreau, whose writings were among the most influential in establishing the spiritual representation of Wilderness, professed what Roderick Nash called a "theological ecology."[87] "The Earth I tread on," Thoreau said, "is not a dead, inert mass; it is a body, has a spirit, is organic and fluid to the influence of its spirit." [88] He saw humans as being but one component of this holistic system.

Thoreau's cosmos was, essentially, what we have described as "an ultimate value larger than the self." It was beyond, but not separate from the individual. There was an inherent connection to, or "correspondence" between this "macrocosm" and the "microcosm" – the human community. Materialistic and controlling society had separated man from his essential oneness with the universe. Thoreau believed that wild nature, properly approached, could serve as a medium through which one could reconnect to and find harmony with the ultimate reality. In nature one could transcend the invisible boundaries that society (and particularly the church) placed on one's thinking, feeling, and relating. One could transcend the narrow confines of culture and view life from the larger, more objective cosmic perspective.

Certainly, Transcendentalists valued nature as an entity of value in itself. But they did not worship nature per se. Most important, nature served as what historian of religion Mircea Eliade calls a "hierophany." [89] The American flag is a contemporary example. It is not the colored cloth that is venerated so much as the history and ideas it represents. The flag is honored because it connects us to our national origin, our Americanism. It evokes a sense of being part of a larger and greater community.

Similarly, one significant contribution of Transcendentalist thinking to today's representation of Wilderness is the notion that as a symbol, Wilderness enables one to grasp intangible concepts. Wilderness has become a symbol through which one may connect to the larger world of which we are apart. Just as the flag serves to enlarge one's identity – from individual to citizen, Thoreau's Walden experience enabled him "to regard [himself] as an inhabitant, or part and parcel of nature . . ." Howard Zahniser, who served as president of the Thoreau Society for a two-year period during the campaign to enact the Wilderness Act, emphasized this function of Wilderness in his article, "The Need for Wilderness Areas." Paralleling Thoreau's thesis, he said that the expanded identity one might find in Wilderness could promote

> an awareness of our human existence as spiritual creatures nurtured and sustained by and from the great community of life that comprises the wildness of the universe, of which we ourselves are a part . . . [90]

Thoreau, and later Zahniser, recognized that such insights do not come easily when one is surrounded by reminders of civilization, be they artifacts of a materialistic culture or people oriented toward it. Thus, the centerpiece of Thoreau's philosophy, a concept that came to

resonate through subsequent wilderness literature and became enshrined in the Wilderness Act, is solitude.

In *Walden*, one of the most widely read and influential of all his writings, Thoreau declared "I went to the woods because I wished to live deliberately, to front only the essential facts of life . . . ." Isolated from the distractions of society, he was able to "cast off the baggage of civilization." The role of solitude in *Walden* provided an important concept Zahniser wrote into the Wilderness Act, the "contrast with those areas where man and his works dominate." This is the contrast that enables one to transcend limiting social influences and prescriptions.

Distance from society's prescribed roles and its pressures for conformity that restrain one's thinking, Thoreau taught, "free one to adventure upon the real concerns of life." Thoreau's influential writings firmly established Wilderness as a setting conducive to introspection and self-reflection, a prerequisite for attaining a spiritual perspective.

Especially effective in conveying this perspective was Thoreau's use of wilderness as a setting for an archetypal journey quest. The details of the journey myth are as varied as the historic and cultural contexts in which they occur. But the common theme, found across cultures and throughout time, is the story of an individual who leaves society in search of some tangible goal that symbolizes an intangible treasure: their true self – an identity free of the need for the approval of others. The challenges, dangers, ordeals, and temptations they face represent the powerful force of conformity. The grail, chalice, golden fleece, or other treasure the sojourner seeks represents the freedom he or she finds from the roles and identity imposed by the dominant society.[91]

Thoreau's physical journeys to the wilderness of Maine and Canada were inward journeys as well. They were a means of transcending the status quo and exploring his potential. This is a central message of *Walden*, in which he told his readers to "be the Lewis and Clark and Frobisher of your own streams and oceans; explore your own higher latitudes." [92]

Thoreau significantly contributed to the representation of Wilderness as a place where one's physical passage becomes an analogue for an inward passage. The unknowns of the Wilderness are metaphors for the unknowns within, physical discoveries correspond to personal discoveries. Like the ancient hero of the journey quest, Thoreau becomes the reader's persona, his or her symbolic representative in the quest for transcendence, going beyond the boundaries society places on one's thinking and feeling. The potential for wilderness experience to serve this spiritual function was the basis of his most often quoted statement, ". . . in Wildness is the preservation of the World."[93]

Thoreau's employment of the ancient journey narrative was and continues to be appealing to a nation whose history is seeped in journeys of exploration and migration, of travels from areas of restriction to those of freedom. [94] Often citing Thoreau, wilderness writers continue to express the spiritual aspects of Wilderness in the context of a journey.

Finally, it is significant that Thoreau always returned from his wilderness trips. He left Walden Pond because, he said, he had other lives to live. He established Wilderness as a place one journeys to for spiritual inspiration and growth, but always returns from. This characteristic of the wilderness experience became enshrined in the Wilderness Act's description of Wilderness as a place "where man is a visitor and does not remain." Following Thoreau's example, all the giants of the wilderness literary tradition represented Wilderness as a setting for outward and inward voyaging, not as a place to live or a lifestyle.

Transcendentalism expanded, popularized and Americanized the Biblical idea of Wilderness as a setting for a spiritual journey quest. A stay in Wilderness was not represented as superior to life in civilization, but rather complemented it. It served as an antidote. More important than the escape was the return. Wilderness was essentially a medium through which the spirit was enriched and strengthened for better functioning in everyday life.

John Muir

John Muir's contribution to the contemporary representation of Wilderness can hardly be overstated. Drawing upon the emerging ecological and evolutionary thinking of his time, Transcendentalism, European Romanticism, and Eastern philosophies, he greatly expanded the spiritual associations of Wilderness. As important as his ideological contributions was the fact that Muir was an enormously effective publicizer. His thirteen books and innumerable articles in popular magazines were and continue to be highly influential in connecting spirituality with Wilderness. His work was widely cited by the framers of the Wilderness Act. His evangelical style, religious phraseology, and effusive descriptions of the spiritual nature of wilderness features and experiences continues to be widely emulated in the popular wilderness literature.

Muir repeatedly spoke of experiencing God and the Creator in Wilderness, but he was not referring to a personified deity. His God was nature, the divinely inspired force of ecological and evolutionary process, of which he believed man was an inseparable part. His ecological thinking is reflected by his widely quoted statement that "When we try to pick out anything by itself, we find it hitched to everything in the Universe."[95] In contrast to the Christian separation of man and nature, he preached that man was "part of wild Nature, kin to everything." [96]

Muir was greatly influenced by Darwin's theory of evolution and particularly its implication of the common origin of all life, including man. One implication Muir drew from evolutionary thinking is reflected by his question, "Why should man value himself as more than a small part of the one great unit of creation?" [97] Sensing oneself to be part of something greater, vaster, and timeless led to a theme that resonates through the writings of Muir and subsequent advocates: humility. Both the humility one should feel in the face of this recognition and the reactionary nature of Muir's ideas are evident in his pronouncement that "the universe would be incomplete without man; but it would also be incomplete without the smallest transmicroscopic creature that dwells beyond our conceitful eyes and knowledge."[98]

Muir's evocative descriptions of his experiences on mountain tops and in mountain valleys and chasms were particularly religious in character. They clearly convey the notion that one's sense of scale, of proportion in the larger scheme of things, is most apprehensible in proximity to features of great heigh and depth. Thus, Yosemite Valley was "the grandest of all the special temples of Nature I was ever permitted to enter . . ." [99] This "diminutive effect" as it is described by environmental psychologists has been recognized for centuries. It was built into Gothic Cathedrals to instil humility. [100] Muir's widely read association of dramatic and precipitous landscape features with spiritual experience was widely emulated by succeeding wilderness writers. Undoubtedly, it influences the expectations their readers bring to the Wilderness.

Muir's repeated metaphoric reference to the cathedral and temple of dramatic wilderness features conveys the notion that such places are sacred. Like religious structures, they are sacred because they are particularly conducive to one's perception of being part of something larger, greater and timeless. Further, his descriptions of entering mountain valleys or canyons convey the idea that one is transitioning from traveling on the land to entering it. They made one more receptive to Muir's central message that humans are not the purpose of the universe, but are part of it.

Thus, another spiritual effect Muir describes is that of being enveloped by or immersed within the landscape."Another glorious Sierra day," Muir wrote, "in which one seems to be dissolved and absorbed . . ." [101] This is essentially the experience of what psychologist Csikszentmihalyi described as the "flow" state. Muir's sense of self, merged with the mountains, contributed to the sensation that he was embedded in a larger system. The expansion of personal identity he experienced is reflected by the signature in one of his travel journals: "John Muir, Earth–planet, Universe." [102]

Thus, central to Muir's influential representation of wild nature was the discovery and experience of an "ultimate value" (the ecological and evolutionary processes of nature). Further, while these processes include humans, they are also beyond the self in the sense they exist independent of us. They have a larger purpose outside our use and benefit. This recognition is humbling, and implicit in Muir's writing is the notion that humility is a prerequisite state for attaining the higher order benefits of Wilderness.

Like Thoreau, Muir found enlightenment when isolated from the influences and reminders of society. Solitude provided his freedom from the "galling harness of civilization." [103] Muir's writings reinforced and extended the role of solitude in attaining spiritual perspectives.

In summary, Muir and writers who followed his romantic genre made several contributions to the representation of Wilderness as both a place of spiritual experience and as a sacred entity. Their main contributions include the ideas that 1) Wilderness is a symbol and reflection of an unseen all-pervasive ordering force of the universe, 2) our species is an interdependent component of the Universe and its community of life, 3) one should approach Wilderness with and experience humility, 4) solitude is conducive to a perceptual shift necessary for introspection and self-reflection, 5) the surrounding presence of dramatic features and vast expanses is particularly

conducive to realizing one's place in the larger scheme of things.

Aldo Leopold

Ecologist Aldo Leopold, "the third giant of wilderness philosophy"[104] is perhaps better known for popularizing the scientific and cultural heritage values of Wilderness than the spiritual aspects. His writings are not evangelical in voice and are largely devoid of religious terms. But without using the word *spiritual* his numerous essays and classic book *A Sand County Almanac* substantially contributed to the spiritual representation of Wilderness.

Leopold's primary contribution here lies in the application of the ideas expressed in his widely cited concept, the "Land Ethic." It suggests an orientation toward an ultimate value beyond the self: the natural community, with all its life forms, soil, waters, plants and importantly, "the natural processes by which the land and the living things upon it have achieved their characteristic forms (evolution) and by which they maintain their existence (ecology)." [105]

A reaction against the Abrahamic concept of land as "a commodity belonging to us," the Land Ethic proposes that we "see the land as a community to which we belong . . ." [106] "A land ethic," Leopold wrote, "changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it."[107]

The orientation proposed by the Land Ethic serves the spiritual function of enhancing the meaning and purpose of one's life by emphasizing that "we belong" to this ultimate value. We are, Leopold wrote, a "member and citizen of it." In contrast to the dominant Christian separation of man and nature, the Land Ethic connects one to, anchors one within what Thoreau called the cosmos. This expansion of one's identity is at once ennobling and humbling. Drawing upon and contributing scientific justification for ideas Muir popularized, Leopold declared that "Men are only fellow-voyagers with other creatures in the odyssey of evolution." [108] More strongly emphasizing the reactionary aspect of the wilderness idea and the role of humility, Leopold declared that the wilderness movement was "a disclaimer of the biotic arrogance of *Homo americanus.* It is one of the focal points of a new attitude–an intelligent humility toward man's place in nature."[109]

The capacity to perceive such deeper meanings of natural science, was, Leopold wrote, "the woodcraft of the future."[110] He recognized that the capacity for what we have defined as the spiritual dimension depends on the set of beliefs, attitudes and understandings one brings to the setting. Referring to Daniel Boone's limited perception of the Wilderness, Leopold said the woodsman's reaction to Wilderness "depended not only on the quality of what he saw, but on the quality of the mental eye with which he saw it. Ecological science has wrought a change in the mental eye."[111] Seeing from an ecological and evolutionary perspective, Leopold believed, would open people to the sense of being part of the community of life. As a practical example, he hoped this perspective would enlighten hunters, enabling them to perceive the swoop of a hawk as part of "the drama of evolution" rather than "only a threat to the full frying pan."[112]

In summary, Leopold's description of the intricacies and interrelatedness of ecological and evolutionary processes – in which man is embedded – served to lend scientific credibility to the spiritual insights of the preceding Transcendentalists and Romantic Naturalists. His notion of human relatedness to the ultimate forces of the Earth underlie his many scientific, recreational, and aesthetic ideas about Wilderness, ideas which, as Roderick Nash states, "quickly became gospel among preservationists and were woven into the fabric of the justification of the continued existence of wilderness." [113]

Sigurd Olson

Sigurd Olson is another giant of the wilderness literary tradition whose extensive writings both reflected and extended the spiritual representation of Wilderness. Olson was a biologist by training, and like Leopold, ecological and evolutionary concepts were prominent in his thinking. But Olson's orientation and influence were based more on his experiences as a wilderness guide. His focus was the beneficial physical, psychological, and spiritual effects of wilderness trips. His books and articles, widely recognized advocacy, and presidency of the Wilderness Society firmly established him as a Wilderness image and impression maker, an authority on the experiential values Wilderness can provide.

"The intangible values of wilderness are what really matter," Olson wrote. He went on to describe them as "the importance of the natural and the sense of oneness with the earth that inevitably comes with it. They are spiritual values. They, in the last analysis, are the reasons for its preservation." [114] Indeed, Olson's representation of Wilderness was so focused on the spiritual dimension that his biographer describes his ideology not as a wilderness philosophy, but as a wilderness theology.[115]

Like his predecessors, Olson believed the spiritual impulse is innate. "Because man's subconscious is steeped in the primitive," he wrote, "looking to the wilderness actually means coming home to him, a moving into ancient grooves of human and prehuman experience." Life in civilization has severed man's spiritual roots, Olson wrote. Gone is his "sense of close relationship, belonging, and animal oneness with the earth and the life around him." But "the spiritual values that once sustained him are still there," he wrote, "in the timeless and majestic rhythms of those parts of the world he has not ravished." [116]

Also like his predecessors, Olson emphasized the role of solitude in the spiritual experience of Wilderness. "The sense of oneness," he wrote, "comes only when there are no distracting sights or sounds." Isolation from the reminders of civilization were conducive to the prerequisite states of introspection and self-reflection, which he eloquently described as "when we listen with inward ears and see with inward eyes, when we feel and are aware with our entire beings rather than our senses." [117]

Like John Muir, Sigurd Olson was the son of a minister who came to see the ultimate reality not in a personified deity but in the governing force of the natural world, most apprehensible in the

least modified environments. His wilderness experience was more a communion than recreation. He used religious terms and images to describe both the experience and threats to it. Thus, he characterized "logging as a violation of sacred space and outboard motors as disruption of a sacramental experience."[118]

Olson extolled the more commonly recognized psychological values of wilderness experience – stress relief, exercise, challenge, and adventure. But over and over, he returned to a purpose of Wilderness consistent with our definition of the spiritual dimension. Wilderness connects one to an ultimate value, "the order and reason that governs [human] existence, the movement of the galaxies, as well as the minutest divisions of matter." [119]

And consistent with research on the spiritual dimension, Olson believed this sense of connection and wholeness serves an adaptive function. It enriches people's lives, he wrote. It "makes them better able to withstand the forces to which they must return." [120] Olson's statement foregrounds a seminal aspect of the spiritual representation of Wilderness. The wilderness experience is less an escape from civilization than a means of attaining the physical and psychological distance necessary to see one's life from a new perspective, in the larger scheme of things. An occasional retreat to the environment that formed and shaped us as a species can serve to enhance functioning in the environment in which we live – and evolve – today.

Howard Zahniser

Perhaps the representation of Wilderness as a setting particularly conducive to the experience of or orientation toward an ultimate value larger than the self finds its strongest expression in the writing of the chief author and lobbyist for the Wilderness Act. The son of a minister whose four brothers were ministers, and father of two ministers, Howard Zahniser's primary orientation toward Wilderness was clearly spiritual. His orientation can be best understood in light of the philosophy of Henry David Thoreau, whose writings probably influenced Zahniser's wilderness ideology more than any other source. [121]

He often quoted Thoreau and for a period during the campaign to enact the Wilderness Act he served as honorary president of the Thoreau Society. The effect of the "contrast" wilderness provides, and its relation to "the wildness of ourselves,"[122] Zahniser referred to is revealed in the foundational ideas Thoreau expressed in "Walking," which Zahniser was fond of citing.[123]

"I wish to speak a word for Nature, for absolute freedom and wildness," Thoreau began. On one level this describes that "untrammeled" condition of wilderness that Zahniser wrote into the Wilderness Act. But Thoreau was also speaking metaphorically. His reference to freedom and wildness was less about his early appreciation of nature's processes than the beneficial effect of one's being immersed in them. In Wilderness one was away from – saw his or her existence in contrast to – the dominating influence of society's norms. The experience could enlarge one's perspective. It could expand one's identity, enabling a person ". . . . to regard [oneself] as an inhabitant, or part and parcel of nature." Immersion in Wilderness, Thoreau believed, is

conducive to opening one to the humbling, yet ennobling, recognition that our species is an inherent part of something greater, vaster, and timeless.

Thus Thoreau's "tonic" effect of wild country was that it provided an intellectual and experiential contrast that might enable one to transcend the narrow confines of human-centered, self-centered individualism. One might attain a sense of proportion in the larger scheme of things. One might connect to and sense relationship with the evolutionary force that once surrounded and formed us as a species, Zahniser's "wildness of ourselves."

In his article *The Need for Wilderness Areas*, inserted into the Congressional Record by Wilderness Bill sponsor Sen. Hubert Humphrey, Zahniser emphasized that the potential for wilderness to evoke this transcendent perspective was among the needs for and purposes of "a national program for wilderness preservation." [124]

Zahniser acknowledged the more tangible and commonly understood recreational, scientific, and ecological values of wilderness, but emphasized that "THE MOST PROFOUND of all wilderness values in our modern world is an educational value" (emphasis his). By "educational value" Zahniser was specifically referring to the capacity of wilderness to enable one "to sense and see his own humble, dependent relationship to all of life." He believed that the "understandings" implicit in this wilderness way of perception and relation might promote

> an awareness of our human existence as spiritual creatures nurtured and sustained by and from the great community of life that comprises the wildness of the universe, of which we ourselves are a part . . .

Zahniser's thinking, reflecting the spiritual origin and driving force of the wilderness movement, was a response to the belief that as the human domination of nature progressed, people became

> separated by civilization from the life community of their origin – have become less and less aware of their dependence on other forms of life and more and more misled into a sense of self sufficiency and into a disregard of their interdependence with the other forms of life . . .

Over and over, Zahniser spoke to the contrast wilderness provides to this sense of separation. It provides a contrast to an anthropocentric orientation in which "we forget that the real source of all our life is not in ourselves . . ." Through this contrast "the fundamental need for areas of wilderness" is realized: "a true understanding of ourselves, our culture, our own natures, and our place in all nature." As a prerequisite to attaining these understandings, Zahniser said

> We deeply need the humility to know ourselves as the dependent members of a great community of life, and this can indeed be one of the spiritual benefits of a wilderness experience. Without the gadgets, the inventions, the contrivances whereby men have seemed to establish among themselves an independence of

> nature, without these distractions, to know the wilderness is to know a profound humility, to recognize one's littleness, to sense dependence and interdependence, indebtedness and responsibility.

This statement underscores the fact that Zahniser's motivation for excluding motor vehicles, motorized equipment, mechanized transport, structures and installations in the Wilderness Act (Subsection 4(c), PROHIBITION OF CERTAIN USES) was not simply to protect the physical condition or recreational aspects of Wilderness. Through our act of foregoing these conveniences, through our decision to restrain and limit ourselves arises a paramount benefit of Wilderness: We might come to "know ourselves" differently. Free of these reminders of industrial civilization, and free of the sense of domination they implicitly convey, we might go beyond intellectually knowing to "sense" – to know experientially – our connection and obligation to the larger world of which we are a part.

Clearly, Zahniser did not intend this potential for expanded awareness to be an incidental purpose of Wilderness, secondary to protecting the Wilderness condition. He went on to state that

> Perhaps, indeed, this is the *distinctive* ministration of wilderness to modern man, the characteristic effect of an area which we most deeply need to provide for in our preservation programs. (emphasis his)

We can assume that Zahniser, the meticulous wordsmith, chose the word *ministration* purposely. It means to minister to, to serve one's deeper needs. This "characteristic effect" is a spiritual effect, without using the potentially controversial word *spiritual*.

Like his predecessors, the author of the Wilderness Act represented Wilderness as part of a reactionary movement, a counterpoint to an increasingly secular and materialistic society. A wilderness orientation served to enable one to transcend thinking "of himself as the center of the universe." [125] More strongly stated, it was an aid to "forsaking human arrogance and courting humility in respect for the community and with regard for the environment. [126]

Also like his predecessors, Zahniser wrote that Wilderness was "not a disparagement of our civilization – no disparagement at all– but rather an admiration of it to the point of perpetuating it." [127]

Zahniser's repeated use of the phrase "wilderness character," in the Wilderness Act served much like Thoreau's reference to nature's "freedom and wildness." Both represent two landscape attributes: a physical condition and a psychological effect. On the surface, they describe the untrammeled state of a landscape, its lifeforms, and the ecological and evolutionary processes in which they are embedded. On a deeper level, they describe the spiritual dimension of Wilderness: the capacity of a place set apart to enlarge our thinking, to evoke the recognition that we are interdependent and obligate members of this larger community of life. It is these inseparable attributes of Wilderness – and the enspiriting effect honoring them has upon us – that Zahniser

said we most deeply need to provide for in designating Wilderness.

Wilderness Art

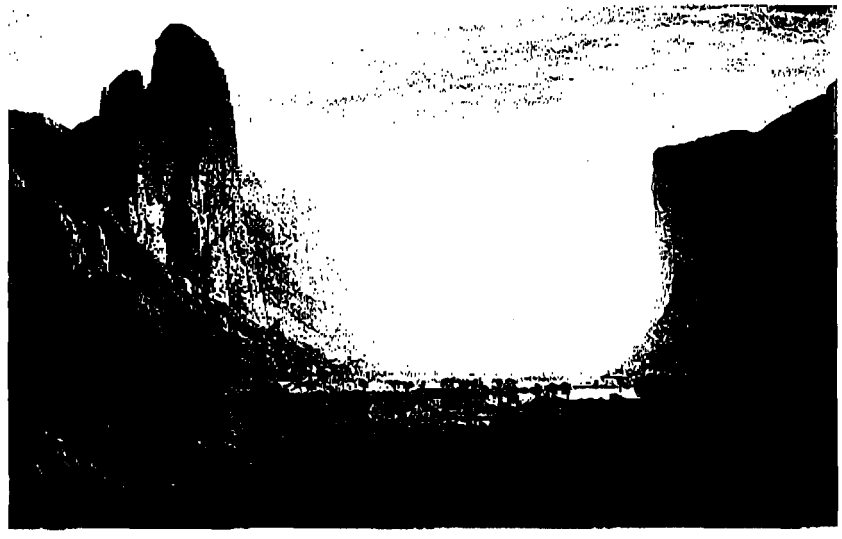
We will now consider how art has provided a visual representation of these spiritual aspects of Wilderness.

The utterly intangible nature of the spiritual experience or orientation, the fact that it arises, at least in part, from the unconscious, intuitive, precognitive, preverbal realm of the brain's limbic system make it difficult to conceptualize linguistically. As we have noted, even the giants of the wilderness literary tradition frequently admitted the inadequacy of their essays and books to capture the ineffable nature of this dimension. Early in the development of the American wilderness ethic the symbolic language of art came to be employed to convey both the intellectual and experiential underpinnings of spirituality so inadequately expressed by words.

We are a symbol making species. We understand intangible entities such as spirituality by drawing analogies between them and tangible things. The capacity of an object or image to promote our grasp on complex ideas and emotions has roots in our evolutionary history. Like myth, metaphoric understanding serves the adaptive function Carl Jung described as providing "the means by which the contents of the unconscious can enter the conscious mind." [128] More recently, psychologists have considered a function of landscape images that goes beyond enabling viewers to "see" and conceptualize places for which they have no direct experience. Rachel and Stephen Kaplan, for example, found that images can enable viewers to vicariously experience or project themselves into portrayed places and situations.[129]

Thinking and sensing through images rather than words serves to enable one to feel, to experientially know, meanings that cannot be fully comprehended intellectually. As symbols, artistic images can provide what psychologist Eugene Glenden calls a "felt sense," that is, "An internal aura that encompasses everything you feel and know about the given subject." [130] They evoke prescribed "feelings," defined by Herbert Schroeder as not simply emotions, but "complex, nonverbal, experiential qualities that convey the totality of our past experience, memories, beliefs, and values relating to particular environments." [131] The notion that the intellect alone cannot know Wilderness has always been an axiom of the wilderness ethic.

The Hudson River School of Art



The spiritual ideas and feelings ascribed to Wilderness by the Transcendentalist and Romantic writers first found visual and visceral expression in the Hudson River School of Art, circa 1820-1875. This genre of art is considered to be the first uniquely American style. Previously, American art imitated European styles and subjects, emphasizing humanized, pastoral landscapes. Nature had been relegated to the background, important only as a setting for people, their activities, and accomplishments.

The Hudson River School began with a group of artists focused on the Hudson River Valley, but their subject matter soon extended to the west coast, emphasizing the Rocky Mountains and Sierras. Their work featured the grandeur, vastness, and, especially, the sublimity of wild nature. Sublime landscapes were places of evocation, places whose vast or monumental features at once reflected the power or an ultimate reality (God or nature) and the smallness, frailty, and relatedness of humans within the larger scheme of things.

Critics of this style point out that it is not realistic. In depictions of specific places, heights and depths were exaggerated. Vistas were extended. Effusive vegetation, towering gnarled trees or precipitous rock outcroppings were added for effect. Many paintings are referred to as landscape composites, or even constructions. Many Hudson River School paintings have been rightfully categorized as mythical landscapes.

But like myths, the purpose of these images was not to accurately portray the details of landscapes, but to convey deeper meanings revealed by them. Like myths, they served as mediums through which intangible, subliminal concepts can be grasped, or at least made more apprehensible.

Thus the Hudson River School should not be viewed as representational, but revelatory. It sought to reveal what wild nature signifies. It conveyed the spiritual, moral message the receptive and prepared mind will find in unaltered landscapes. While it may not accurately depict the appearance of nature, it does accurately express the ideas, values, and feelings of the artist, largely obtained from the Transcendental and Romantic literature. It is intended to trigger symbolic associations. Metaphorically rich and often overtly iconic, it is the visual embodiment of what was perceived as the spiritual dimension of Wilderness during the formative era of the American wilderness ethic.

We will consider how art can visually express many of the spiritual aspects attributed to wilderness by examining some representative Hudson River paintings.

The Voyage of Life

Thomas Cole (1801-1848) is considered the founder of the Hudson River School. Shown here is the first of his epic four painting series, *The Voyage of Life*. It allegorizes Everyman's passage through life. The series depicts four stages of life – childhood, youth, adulthood, and old age. Like the protagonist of journey legends, the subject of the series serves as the viewer's persona, his or her symbolic representative in the search for ultimate meaning, relation, and integration. Like Thoreau's spiritual evolution through the chapters of *Walden*, Cole employs the voyage as a metaphor for one's passage through higher levels of awareness.

This picture provides a pointed contrast to the classical theme of an angelic figure delivering an infant from the heavens. Instead, the baby (humanity) emerges from a cave. Its origin is within the Earth. The message is clear: we did not come into this world, we came out of it. We do not live on the Earth, but within it. In sharp and perhaps heretical contrast to the prevailing belief that the Earth is a testing ground from which the righteous will ascend to their ultimate home in heaven, this painting suggests that our true home is the Earth. Its suggests that we are not an alien species, or separate from the planet's other life forms. Rather, we are, as Thoreau said, "an inhabitant, or part and parcel of nature." [132] This is a visual embodiment of the notion we are embedded within the ultimate reality, the Earth. Thus in placing one in a broader frame of reference, in suggesting a connection to or rootedness within an ultimacy, its message is clearly transcendent. It evokes a state in which, as Cole said in his *Essay on American Scenery*, "the mind is cast into the contemplation of eternal things." [133]

This painting also expresses a theme common to early wilderness literature and art: humility. The two figures are dwarfed by the setting. Contributing to nature's dominance is the massive, precipitous mountain from which they have come. The darkness of the cavern conveys a sense of mystery. It evokes a feeling for the unknown, unknowable dimension or our origin and nature, within or beyond what we can see.

The Oxbow

This painting by Cole is noteworthy because it both contrasts Wilderness and civilization and suggests their compatibility. The awesome sublimity of Wilderness is expressed on the left half. A reaction to increasing modification and domestication of the landscape, it expresses the effect of what would be lost if "the sublimity of the wilderness should pass away:"[134]

> . . . scenes of solitude from which the hand of nature has never been lifted [that] affect the mind with a more deep toned emotion than aught which the hand of man has touched.[135]

But civilization is not depicted negatively. The idyllic, pastoral landscape on the right is a pleasant environment for the barely discernable shepherds and farmers. Thus, *The Oxbow* translates into an esthetic the idea expressed by wilderness writers from Thoreau to Zahniser: Wilderness complements civilization. The lone diminutive figure looking down from the Wilderness, (perhaps Cole) represents the introspective state of solitude. It suggests that Wilderness provides the distance from civilization necessary to transcend boundaries it places on one's thinking about our place in the larger scheme of things.

Yosemite Valley

This image by Albert Bierstadt is representative of the western phase of the Hudson River School, sometimes called the Rocky Mountain School. The provocative presence of sheer rock faces reveals the awesome majesty of the divine, God or nature. Their verticality and lines support the romantic era

notion that mountains were the New World equivalent of Europe's cathedrals. The valley continues beyond the area we see. It conveys a sense of mystery and unknown, a farness that beckons one to explore that which is beyond and within. The calm reflective water before the artist in the foreground imbues the scene with a self-reflective mood and invites the viewer to contemplate the meaning of this wilderness cathedral. This is a setting in which the subjects can know the divine directly, unmediated by the institutional church.

The human presence is small and transient; our lives are part of the larger, continuing reality. The encompassing mountains suggest the subjects are within nature. The painting responds to Muir's criticism that "most people are on the world, not in it – have no conscious sympathy or relationship to anything about them . . . [136]

Kindred Spirits

This impressionistic painting by Asher Durand shows Thomas Cole and nature poet William Cullen Bryant discussing a Catskill Mountain scene. It visually expresses the close association between the Hudson River School and the early wilderness literary tradition.

Although the figures are recognizable, they are small in comparison to nature. Consistent with the genre, they are not on the landscape as much as within it. They are enveloped by the overarching trees. The solitude, warm light, and tranquility of the scene are clearly conducive to contemplation of the religious message of Bryant's poetry. The effect this painting had on receptive viewers at the time is reflected by an evaluation written during the painting's exhibition in 1848:

> No one can look at his picture of Bryant and Cole in the Catskills, without rising at once, both in sense and association, into a higher range of feelings. . . . is is a picture that illustrates not only the [reproduction] of nature to the sight through the medium of art, but also of conveying to the sympathies the moral of its beauty and grandeur. [137]

Early Morning at Cold Spring

This painting by Durand enables the viewer to project his or herself into a reflective scene, again not looking at nature so much as being embraced by or even within it. It was often referred to as Sabbath Bells, a title taken from one of Bryant's poems.[138]

Looking across a placid bay of the Hudson River, the solitary figure contemplates a group of people on their way to church. The message of the painting is well expressed in one of Durand's letters:

> To-day again is Sunday. I do not attend the church service, the better to indulge reflection unrestrained under the high canopy of heaven, amidst the expanse of waters [139]

The figure's "reflection unrestrained" expresses the Transcendentalist reaction against the stifling effect of church doctrine on one's capacity to independently know the divine. Its fairness from civilization reinforces the cognitive freedom effect of solitude one finds in Wilderness.

The Grand Canyon of the Yellowstone.

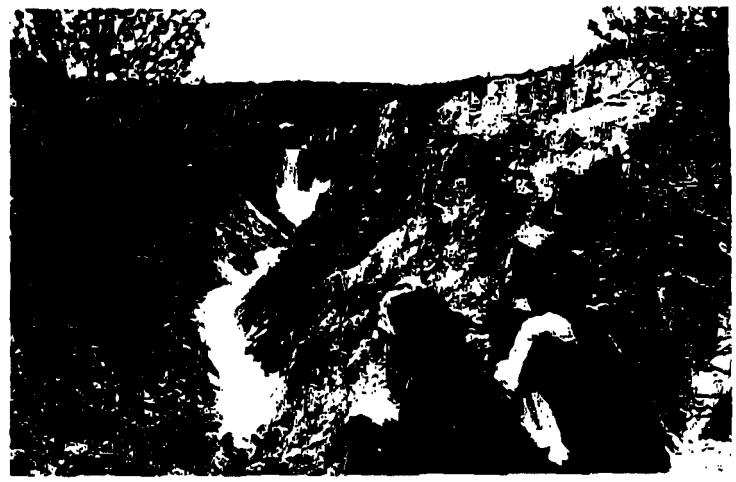
This evocative painting by Thomas Moran was completed in 1872, the year Yellowstone Park, the world's first national park, was established. Congress appropriated $10,000 to purchase the painting that year for display in the Capitol. It was the first and perhaps best known image of a national park and played a significant role in fixing the idea of a designated natural area in the American mind.

Incorporating many of the iconic elements of the Hudson River School ideology, it is a classical expression of the spiritual dimension of the emerging wilderness ethic. The tiny figures express the smallness of man in relation to the natural world. Again, the figures suggest we are not on but embedded within this world. Solitude is an element of their communion with nature, as is the absence of reminders of civilization. In this luminist landscape the pervasive light does not appear to come from above, but seems to emanate from the Earth itself, suggesting that the "ultimate source" can be found on Earth, in nature. One need not look to the heavens for inspiration.

During the mid to late 1800s geology was at the center of the debate about the origin of the Earth, life, and man. Stratified canyons in particular gave monumental expression to the idea that the Earth is unimaginably old, not the product of a literal seven-day creation. One implication of this painting was that it placed humans in the vast geological time frame of the Canyon. From the perspective of the painting's figures, the viewer can see his or her life in proportion to processes and time scales far beyond their lifetime. One is not only embedded within the larger world but within processes that are timeless. This image provides visual expression to rhetorical constructions such as "primordial antiquity," and "ageless eternity" that continue through the wilderness literature.

Enormous age adds another dimension to the capacity of Wilderness to inspire. It also contributes an ethical dimension to wilderness preservation because moral value is attached to destroying or protecting things of great age.

The photograph taken from the site from which Moran made his sketches (Artist's Point) reveals how the depth of the canyon and height of the rock pinnacles were exaggerated. It is evident that the painting was not intended to represent the topography of the canyon. Rather, it viscerally expresses how one should feel in its presence. It triggers associations with the Transcendentalist teachings about our place in the larger scheme of things. A place where the power and majesty of the divine is most clearly revealed, the scene is highly conducive to transcending one's perceptual habits.



As all artistic styles do, The Hudson River School of Art gradually lost favor to paintings of other subjects and in other forms. By 1875 it was no longer the dominant American art form. Photography became a more popular means of representing wilderness, though it focused upon many of the same perspectives.

Conclusion

This exploration began with biologist Olaus Murie's plea for "serious attention to our mental and spiritual needs – hard to define but of greatest importance."

It sought to provide insight into those needs by drawing upon knowledge of the human mind's workings that was largely unavailable to Murie and his predecessors who initiated the wilderness movement. Science has provided empirical understandings for what these visionaries knew intuitively – the great importance of mediums such as Wilderness for opening people to something inside themselves that seeks relatedness to something outside themselves. This is the spiritual function – of Wilderness, or a church, memorial, shrine, megalith – of any consecrated place. An adaptive mechanism, the spiritual dimension of Wilderness has evolved, is evolving, and will continue to evolve in response to changes in ourselves and our relationship to the natural world. The manifestation of spirituality in the wilderness concept both reflects the unmet needs of our urban, commodity-driven culture, and reveals some archetypal part of us that this culture has obscured. The types of studies we have considered provide but an elemental understanding of the role of these forces and how they interact.

But they serve to enable understanding of and provision for the spiritual dimension of Wilderness in psychological – that is, secular – terms, thus making it a legitimate concern of science-based natural resource agencies. Yet studies do not, cannot, refute the possibility that divine forces may have guided this development, making it also acceptable to people of religious faith.

But wilderness stewards need not concern themselves with the question of whether or to what degree the spiritual impulse originates in evolutionary process, social construction, or perhaps, divine intervention. They need only to know that the longing to connect to an ultimate value larger than the self has always been and continues to be central to the idea of Wilderness. And while Wilderness is a tangible place, it is also the physical embodiment of ideas. It is a system of belief and feeling about our role in the larger scheme of things that has been given geographic expression in places that have been set apart – officially set apart from the utilitarian orientation that has come to rule the major part of our lives. Geographically, Wilderness is a remnant of our world that is still natural, wild, and free. Spiritually, Wilderness is a remnant of that part of ourselves that seeks connection, belonging, and rootedness within that world.

Advances in ecological thinking have led natural resource professionals to examine Wilderness as a laboratory of unmanipulated ecosystems. They routinely employ the physical and biological sciences, quantifying the components and interactions of nature, adaptation and evolution, to reveal the effects our alterations have upon the life processes in which we remain physically embedded.

Now natural resource professionals need also to consider the potential of Wilderness as a laboratory of the conditions and processes that once formed and shaped our minds, and continue to influence how we experience and respond to our world. They need to draw upon the

psychological and social sciences to understand more fully why people value the place-idea of Wilderness, and to find what might be learned about ourselves in relation to it.

"The idea of wilderness," wrote Howard Zahniser

> . . . is man's own concept. Its values are human values. Its preservation is a purpose that arises out of man's own sense of his fundamental needs. [140]

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Why We Must Supplement DNL Noise Analysis

By

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Is the Day/Night Average Noise Level (DNL) metric truly as flawed as many citizens believe? Or does it serve its intended purpose of defining noncompatible land use areas and setting boundaries for noise mitigation measures quite well, but fail in communicating noise exposure to the average citizen? Perhaps what is needed is a better way to communicate noise exposure in terms that are more easily understood. Supplemental analysis, using noise metrics in addition to DNL, may be the answer!

This article examines these questions in the context of the origin of the DNL metric as the primary descriptor of community noise exposure, its role in the planning and administration of noise mitigation programs, and its shortcomings in describing noise impacts to the public. Better communication and understanding of noise exposure is not the end objective, but rather a means by which affected citizens, aviation officials and government authorities can come together at the local level to more effectively address their specific noise problems.

Go to any community meeting with airport noise on the agenda, and you will likely hear vigorous citizen complaints that DNL does not adequately communicate noise exposure to citizens who reside near airports or live under flight paths, particularly those who reside outside the airport's published DNL noise contours. You will likely hear the complaint that the Federal Government threshold for compatible land use, set at DNL 65 dB, is too high. When officials respond by defending DNL, citizens usually counter that they don't hear averages – they only hear individual aircraft. Most people find it very difficult to translate the individual noise events that add up over the typical day into an average noise level. This confusion leads to mistrust and the conclusion that DNL understates the noise that many citizens experience.

These views are legitimate and are strong indicators that aviation officials need to find better ways to communicate noise impacts; yet in the process, preserve the vital role DNL plays in administering Federally funded noise mitigation programs.

DNL Background

Before examining the application of various supplemental metrics to this problem, it is important to review the background and use of the DNL metric. The DNL 65 dB guideline was recommended in 1980 by the Federal Interagency Committee on Urban Noise (FICUN), and reaffirmed in 1992 by the Federal Interagency Committee on Noise (FICON).

The origin of DNL as the metric of choice for defining community noise exposure can be traced even further back in time. In 1974, EPA released a publication entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety*, EPA Report No. 550/9-74-004, also known as the *Levels Document*. This document states: *"In order to describe the effects of environmental noise in a simple, uniform and appropriate way, the best descriptors are the long-term equivalent A-weighted sound level (L_{eq}) and a variation with a nighttime weighting, the day-night average sound level (L_{dn})."* It is important to point out the following disclaimer printed on the cover page of the document, which states: *"This document has been approved for general availability. It does not constitute a standard, specification, or regulation."*

When the DNL 65 dB threshold is discussed in public meetings, reference is often made to the DNL 55 dB noise level recommended by EPA in the Levels Document to limit outdoor activity interference and annoyance in residential areas. Many people believe that if Congress were to restore funding to the EPA Noise

Office, and vest the authority in that office to set Federal noise standards or guidelines, then the DNL 65 dB guideline would be lowered from 65 dB to 60 dB or perhaps 55 dB. However, this is not likely,

> *"These levels are not to be construed as standards as they do not take into account cost or feasibility...As specified in this document, it is EPA's judgment that the maintenance of levels of environmental noise at or below those specified above are requisite to protect the public from adverse health and welfare effects...The phrase health and welfare as used herein is defined as complete physical, mental and social well-being, and not merely the absence of disease and infirmity...Thus, as used in this document, the phrase health and welfare will necessarily apply to those levels of noise that have been shown to interfere with the ability to hear."*

considering EPA's qualifiers to their DNL 55 dB recommendation:

Obviously, EPA recognized that achieving an outdoor level of DNL 55 dB is an idealistic goal, stating that it was established without regard to cost or feasibility. Achieving that ideal goal would mean *"undue interference with activity and annoyance will not occur"* (in their terms). Given the current number of aircraft noise complaints from citizens exposed to levels below DNL 55 dB, it appears EPA was optimistic in declaring DNL 55 dB the noise level below which *"...annoyance will not occur."*

Congress responded to the growing aviation noise problem during the 1970s with the Aviation Safety and Noise Abatement Act (ASNA) of 1979, which required FAA to adopt a single noise metric to measure community noise exposure, and made Federal funding available to pay for noise mitigation. In choosing DNL as the single metric and DNL 65 dB as the guideline above, which noise sensitive land use is not compatible with aviation noise, the cognizant Federal agencies (including EPA) carefully considered cost and feasibility. When that guideline was set, Stage 1 and Stage 2 noise level airplanes comprised the majority of the commercial aircraft fleet, and several million persons were living inside DNL 65 dB noise contours around the nation's airports. Had EPA's ideal DNL 55 dB guideline been selected instead, the population residing in noncompatible areas at that time would likely have been more than 20 million people, and mitigation cost estimates would have been staggering beyond all reason.

Part 150 Mitigation Measures and the Federal Guideline for Noise Compatibility

FAA implemented the noise provisions of ASNA in Federal Aviation Regulation, Part 150, and Noise Compatibility Planning. Under that program, billions of Federal dollars have been spent to acquire land and sound insulate homes inside DNL 65 dB contours at participating airports. With the transition to the current all Stage 3 noise level commercial aircraft fleet, the noise contours have been considerably reduced in size. Yet, thousands of people who reside within DNL 65 dB or higher noise contours are still waiting for mitigation (a significant number of those will wait many more years for their turn). For example, the sound insulation program at Chicago's Midway airport is near completion only within the DNL 80 dB contour and that program is just beginning between the DNL 75 and 80 dB contours. As additional airports participate in the Part 150 program, even more persons residing inside DNL 65 dB contours will be lining up for Federally funded mitigation.

Virtually every airport master plan projects annual growth in operations for as far as can reasonably be projected into the future. Now that the Stage 3 transition is complete, this growth trend is predicted to far outstrip further shrinkage of noise contours from quieter aircraft, meaning noise contours will grow around many, if not most airports for the foreseeable future. Transition to Stage 4 noise levels alone will not keep pace, and considerable area recently removed from DNL 65 dB contours via the Stage 3 transition sadly is in grave danger of being lost to this trend. A precious national resource (reduced noise contours) that cost a small fortune in new airplanes will be squandered if local officials fail to act very soon!

At the current rate of Federal noise program funding (even though in the hundreds of millions of dollars each year) it will take many more years to address all of the currently existing noncompatible land uses around our airports. So the key question is *what would be the effect of reducing the Federal noise compatibility guideline from DNL 65 dB to a lower threshold, such as 60 dB?*

The answer is that millions of persons would immediately find themselves residing in newly designated noncompatible areas, and many of these areas were designated as compatible when they were developed under the current DNL 65 dB guideline. Federal funding to address these newly designated noncompatible areas would be decades away, assuming that areas impacted at DNL 65 dB and higher would be fully addressed first, and also assuming Congress does not significantly increase funding. Had a lower Federal guideline been initially set, such as DNL 60 dB, there would now be far less development between DNL 60 and 65 dB contours, but that opportunity has long since passed.

The logical conclusion is that reducing the guideline threshold before substantially all existing residences within the DNL 65 dB contours are sound insulated or acquired would greatly expand the problem and contribute little or nothing to the solution. The efforts that various stakeholders have been directing toward lowering the Federal guideline might better serve the cause if they are redirected toward persuading Congress to significantly increase noise mitigation funding. While a change in the Federal guideline may not be advisable in the near term, it might be logical and feasible to change it in the future when most of the sound insulation programs around the nation's airports are completed. The good news is that individual communities do not have to wait for a change in the Federal guideline to take action.

The best course of action for individual communities is to use their zoning authority to establish noise standards that reflect the will of their citizens and are affordable to implement. If local officials fail to act soon to protect the areas that have recently been removed from their DNL 65 dB contours as a result of the transition to an all Stage 3 fleet, development will follow shrinking noise contours and this one-time opportunity will be lost.

A good example of responsible local action is Cleveland, where officials recently set the local aviation noise standard at DNL 60 dB, and the recent Part 150 update included a measure, approved by the FAA, to use Passenger Facility Charges to fund the sound insulation program out to the DNL 60 dB contour. Minneapolis is currently updating its Part 150 with the same measure. Communities need not wait for a change in the Federal guideline to take comparable action. Orlando is another excellent example of a city that has effectively protected its airport; by implementing a strong noise overlay zoning code that includes noise disclosure within the DNL 55 dB contour. Similar action by many other cities will speed the day when a change in the Federal guideline becomes practical.

DNL has functioned very well for over 20 years as the primary planning and decision tool for administration of Federally funded airport noise mitigation programs, and as the FICON pointed out in its 1992 report, "*...no other metrics are of sufficient scientific standing to replace DNL.*"

Supplemental Metrics

The FICON report went on to recommend the use of supplemental metrics "*...to best determine noise impacts at specific noise-sensitive locations,*" and further stated:

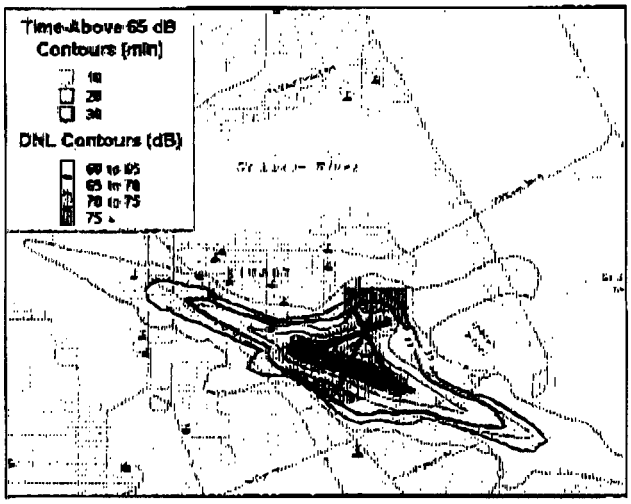
> - *The purpose of a supplemental analysis is to convey with more specificity and detail the potential effect of changes to the environment as a result of a Federal action.*
> - *Any additional analysis needs to inform both the Federal decision-maker and the affected public*

There are several noise metrics that can be used individually or in combination to describe exposure, which are far easier for the public to understand than the DNL metric. They include, but are not limited to:

- Sound Exposure Level (SEL), which is a measure of duration and magnitude of a single noise event in A-weighted decibels;
- Equivalent Sound Level (Leq), which is the average noise level over a specified time period, such as school hours;
- Time Above (TA), which is the amount of time that a noise event exceeds a maximum decibel level (L_{max}) threshold; and,
- Number of Events (N-Level), which is the number of noise events above a maximum decibel level threshold during a specified period of time.

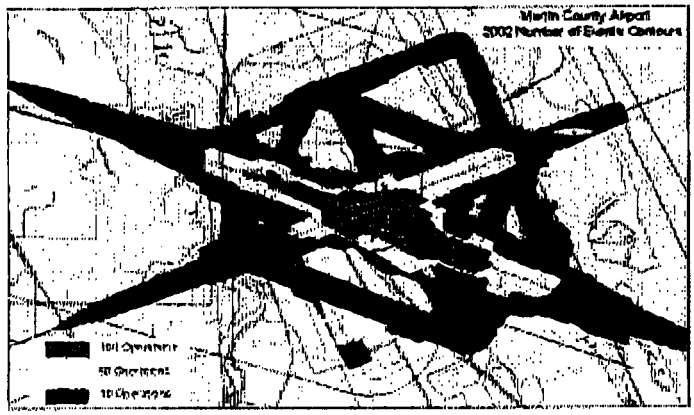
Two supplemental metrics that clearly convey cumulative noise exposure in terms the public readily

understands are the TA and N-Level metrics, with results presented graphically as contours overlaid on a local area map. A TA analysis is expressed as the number of minutes in a certain time-period (typically the average annual day), that noise created by aircraft operations exceeds a specified A-weighted decibel level. The TA metric can be applied to any period of time, such as local school hours. The results of TA analysis are displayed as an overlay of contour lines on the same background map as the DNL noise contours, and may be shown with or without the DNL contours.



The general aviation airport example above shows DNL contours out to DNL 60 dB overlaid with TA contours of 10, 20 and 30 minutes above 65 dB for the average annual day. The threshold of 65 dB L_{max} was selected in this case, because it is the approximate level for noise to interfere with conversation in an outdoor environment, but any threshold may be selected.

The N-Level metric shows the average number of events above a specified maximum decibel level for a given period of time (such as the average annual day). N-Level contours show the geographic distribution of the average number of events above a certain noise level for a given period of time, such as the average annual day. The results of N-Level analysis are generally displayed as map contours with each contour line showing the average number of expected events above the specified decibel level during the selected time period. The number of events in areas between the contour lines would fall somewhere in the range between the two contour lines.



The general aviation airport example above shows contours for 10, 50, and 100 events above 65 dB L_{max} for the average annual day. In this case, it was necessary to show the 10 events contour in order to close all of the contours along the touch and go pattern flight tracks for each runway. The threshold levels selected for which contours to show is highly flexible, and is typically selected at the discretion of airport and community officials, along with input from other stakeholders, to meet specific study objectives.

When TA and N-level contours are presented along with DNL contours, the public receives not only the average airport noise level, but the amount of time airplane noise exceeds the specified level and the number of times each day that noise exceeds the specified level. When these metrics are presented along with DNL, a complete picture of airport noise exposure in the community emerges, painted in clear terms. The threshold maximum noise levels selected for TA and N-level analysis will determine the extent of the area included in the resulting contours. Thus, these metrics enable the selection of thresholds that can extend the analysis far beyond the traditional DNL contours. For example, N-level analysis is an excellent tool to develop preferential flight paths in both the near and far proximity of an airport. The TA and N-level analyses can also show the potential benefits of employing noise abatement arrival and departure procedures on a particular runway far more definitively than DNL. Thus, when these metrics along with DNL are employed, local officials are far more informed in their decisions regarding land use and zoning in airport environs.

FAA Position on Supplemental Analysis

A big question is what position does the FAA take on supplemental analysis? Some FAA officials with noise program responsibilities have stated personal opinions that supplemental metrics are better than DNL for communicating noise impacts to individual citizens. An FAA official recently made that statement during his presentation at the annual Airport Noise Symposium in San Diego.

While FAA has not issued a definitive written policy on the matter, the 1992 FICON report, in which FAA participated, clearly supports the use of supplemental metrics. The Federal Interagency Committee on Aviation Noise (FICAN) was formed as a standing technical aviation noise committee in the early 1990s as recommended in the FICON report. In February 2001, the FICAN held a public forum on the use and application of noise metrics to supplement DNL analyses, and published their findings in February 2002 as follows: *"FICAN finds that Supplemental metrics provide valuable information that is not easily captured by DNL. Supplemental metrics are particularly useful for assessing the effects of aircraft noise on interference with activities such as sleep and speech. In these cases, the use of metrics such as single exposure metrics can provide a more meaningful estimate of interference than a single DNL estimate."*

In July 2001, FAA published for public comment a proposed policy document entitled *Aviation Noise Abatement Policy 2000,* which reflects their future vision for addressing noise issues, and strongly indicates their intention to focus more attention on noise outside DNL 65 dB contours. In that document, one of FAA's stated goals is to: *"Design air traffic routes and procedures to minimize noise impacts in areas beyond the jurisdiction of airport proprietors, consistent with local consensus and the efficient use of airspace."* One of the proposed policies states: *"As requested, the FAA will assist State and local governments in establishing policies and practices to minimize noise sensitive land uses around airports, including locally determined buffers outside areas of significant noise exposure."*

To successfully implement this policy and achieve its goal, FAA must employ noise metrics that will clearly show the impacts of noise well beyond DNL 65 dB contours. FAA officials have historically encouraged the use of supplemental analysis in Environmental Assessments and in Environmental Impact Statements, but have not issued a specific policy statement on use of these metrics in Part 150 studies. In recent meetings with the author, key FAA Headquarters officials stated that when airport officials include sufficient justification in their noise study grant applications, identifying specific metrics and how they will be applied, they can approve the supplemental analysis. They further qualified their position, stating they are not supportive of any open-ended policy that would fund supplemental analyses that are not specifically justified.

Recognizing the value of supplemental metrics in communicating noise exposure to the average citizen, several airports have moved forward and are currently including TA and N-Level analysis in their Part 150 updates. Many other airport and local government representatives are also considering inclusion of supplemental analyses in their future Master Plan and Part 150 updates.

The primary vehicle available to effectively achieve FAA's proposed goal and policy stated above is the Part 150 program. Identification of and agreement on preferred flight tracks in a Part 150, as envisioned in FAA's proposed noise policy, requires noise analysis far beyond the DNL 55 contour. The parameters of the TA and N-Level metrics can be set to effectively perform this analysis, even in remote areas that are many miles from an airport where DNL is not well suited (it is generally accepted that DNL analysis degrades in accuracy at levels below 65 dB and is rarely used below 55 dB).

In the opinion of the author, the FAA should strongly endorse the use of appropriate supplemental metrics in the Part 150 program. After all, it is the program specifically designed for use by airports and communities to reach local consensus on noise mitigation measures, including preferred air traffic routes, and to formally communicate the will of the stakeholders to the FAA.

Summing Up

The FAA's proposed noise policy, the 1992 FICON Report, and the recent FICAN findings all provide strong support for the use of additional noise metrics to supplement DNL analysis. Widespread use of appropriate supplemental metrics in airport noise studies would greatly improve public understanding of noise exposure and impacts, because the average citizen with little knowledge of acoustics can easily understands them. By combining Time-Above and Number of Events with other noise metrics and DNL analysis, the responsible officials could produce noise studies that are more comprehensive far more acceptable and credible with the public.

Go Do The Right Thing

In the author's view, decision makers need to consider an appropriate mix of DNL and supplemental noise analyses in their future airport noise studies that will:

1. Best describe noise exposure in terms the general public can easily understand,
2. Facilitate a better public participation process for considering alternatives that leads to consensus, and
3. Enable decision makers to select and implement the most effective noise abatement and mitigation measures.

Note: Mr. Albee recently retired from the FAA where he spent 9 years as Manager, Policy and Regulatory Division in the Office of Environment and Energy. He also served as FAA's first Aviation Noise Ombudsman.